



Use of MOCAF flour as raw material for healthy and hygienic lakar crackers in N&N MSMEs

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ABSTRACT

In the vicinity of N&N Micro, Small, and Medium Enterprises (MSME) in Jatiroke Village, Sumedang, West Java, cassava plantations abound, yet their harvest is often undervalued and sold at low prices. To enhance economic value, cassava from Jatiroke Village is now being processed into Modified Cassava Flour (MOCAF) for use as a primary ingredient in lakar cracker production at N&N MSME. Previously, wheat and tapioca flours were sourced from the market for cracker production. The objective of this Community Partnership Empowerment (CPE) initiative is to replace wheat flour with locally processed MOCAF, diversifying food ingredient sources using available resources. MOCAF is not only gluten-free but is also deemed safe for consumption, especially for those with autoimmune diseases, memory loss, and autism. The CPE program includes training on MOCAF flour production and hands-on experience in making lakar crackers with MOCAF as a core ingredient. This comprehensive effort aims to promote N&N MSME's growth by incorporating innovative technology for the production of healthy and hygienic crackers, thereby benefiting public health, particularly individuals with autoimmune conditions. This strategic shift not only holds economic promise but also contributes to the well-being of the community.

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1. INTRODUCTION

The food and beverage industry (mamin sector) plays a significant role in the economic growth of Indonesia. The government has made the mamin sector a priority for driving the economy during the COVID-19 pandemic. Currently, the mamin sector is experiencing rapid growth, as evidenced by its contribution reaching 37.77%. Since 2021, the mamin industry has seen a 3.75% increase. Investment in the mamin sector has reached Rp 19.17 trillion, and international trade in mamin products has reached 10.92 billion dollars (Ministry of Industry, 2022).

One of the Micro, Small, and Medium Enterprises (MSME) operating in the main sector in Jatiroke Village, Jatinagor Subdistrict, Sumedang is MSME N&N. MSME N&N produces functional food products, specifically cassava crackers made from wheat flour and tapioca flour for the market. This business has market potential after the COVID-19 pandemic, but it still faces weaknesses and challenges in the business aspect related to raw material usage and health concerns.

The idea to produce cassava crackers by MSME N&N since 2018 stemmed from the abundance of cassava in Jatiroke Village. However, MSME N&N lacked knowledge on how to process cassava into flour, especially MOCAF (Modified Cassava Flour). Therefore, with the aim of replacing wheat flour with self-processed MOCAF in the production of cassava crackers, the Community Partnership Empowerment (PKM) program seeks to enable the transformation of cassava into MOCAF, providing an alternative source of local resources for food production. Furthermore, it is expected that the use of MOCAF is beneficial for health and safe for consumption by individuals with autoimmune diseases, memory loss, and autism since MOCAF is gluten-free, non-allergenic, and has high nutritional value, including protein and vitamins (Dwipayanti et al., 2020; Herawati et al., 2011).

MOCAF (Modified Cassava Flour) has been widely used in food product processing. According to Subagio et al. (2008), MOCAF is cassava flour modified through fermentation with slaked lime. The modification of cassava can occur through physical, chemical, and enzymatic methods (Koswara, 2009). The modification process that takes place with MOCAF involves biochemical modification with the addition of enzymes (Herawati, 2011). Lactic acid bacteria play a crucial role in the fermentation process, as their activity produces pectinolytic and cellulolytic enzymes that break down cassava cell walls and hydrolyze starch into organic acids (Subagio et al., 2008; Wulandari et al., 2021).

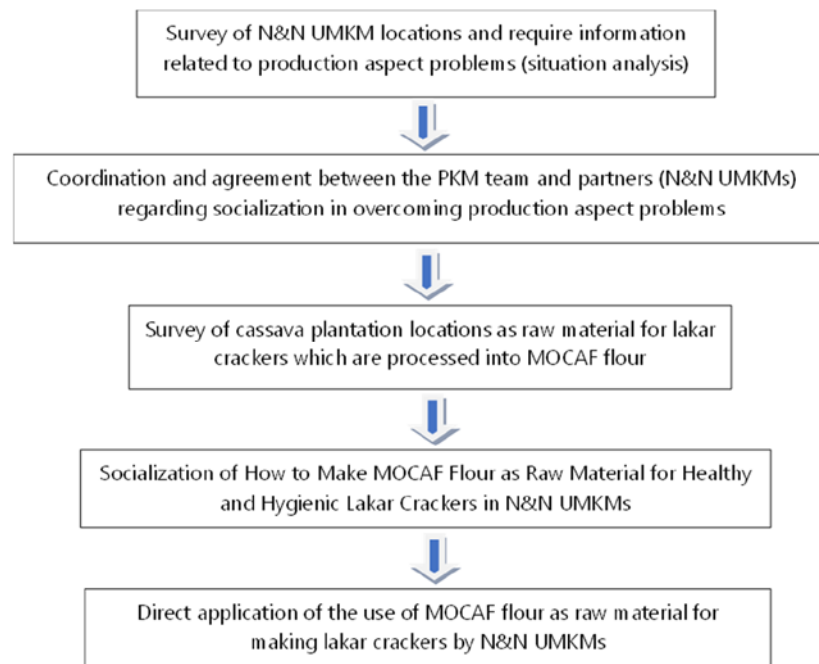


Figure 1. Problem solving framework

Based on this, the goal of implementing the Community Partnership Empowerment (PKM) program is to empower and develop MSME N&N by reducing the use of wheat flour and replacing

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it with healthy and hygienic MOCAF. The utilization of MOCAF can improve public health and provide high nutritional value to MSME N&N entrepreneurs. Additionally, it can enhance the empowerment of cassava farmers in Jatiroke Village by increasing economic value for the local community and creating business opportunities for MOCAF production from their cassava plantations. The problem-solving framework for MSME N&N can be seen in the Figure 1.

2. METHODS

Place and Time

The Community Partnership Empowerment (PKM) activities are divided into four stages as follows: (1) On July 4, 2023, the PKM team conducted a survey of the cassava plantations in Jatiroke Village; (2) On July 11, 2023, the PKM team and partners held a coordination meeting to discuss and agree on the schedule for the dissemination and training on the production of MOCAF flour. This training was scheduled for July 18, 2023; (3) To implement the PKM activities, MSME N&N directly practiced the use of self-processed MOCAF flour as a raw material for making cassava crackers. This practical activity took place on July 25, 2023.

Target Audience

The target audience is N&N MSME employees and the community of Jatiroke Village, Jatinangor Sumedang.

Community Empowerment Methods

The implementation of the Community Partnership Empowerment (PKM) activities began with a site survey of MSME N&N. During this survey, the PKM team engaged in communication about the business operations of MSME N&N and discussed the challenges or issues related to raw materials that hindered the production process. While en route to the MSME N&N location in Jatiroke Village, the PKM team also observed the extensive cassava plantations that served as a livelihood for the people of Jatiroke Village.

Upon assessing the situation, the PKM team agreed to establish a partnership with MSME N&N. The nature of the activities and collaboration included: (1) The PKM team providing solutions to address the challenges related to the production of raw materials for MSME N&N and the issues related to cassava harvesting in Jatiroke Village through a "Socialization on How to Make MOCAF Flour as a Healthy and Hygienic Raw Material for Cassava Crackers at MSME N&N."; (2) MSME N&N directly implementing the use of MOCAF flour in the production of cassava crackers.

This partnership and collaboration aimed to address the challenges faced by MSME N&N and improve the production process, particularly in using MOCAF flour as a healthier and more hygienic raw material for their cassava crackers.

Indicators of Success

Indicators of success in the implementation of this PKM are the implementation of the use of MOCAF flour as raw material for lakar crackers at N&N MSMEs and the Jatiroke village community has processed cassava into MOCAF flour.

Evaluation Methods

As for the evaluation after the implementation of this PKM, N&N MSMEs implemented the use of MOCAF flour which they processed themselves to become the raw material for lakar crackers. After market testing, many consumers liked the taste of lakar crackers prepared using MOCAF flour compared to wheat flour or tapioca flour.

3. RESULTS AND DISCUSSION

N&N MSME Location Survey and Situation Analysis

The implementation of the Community Partnership Empowerment (PKM) activities began with a situation analysis of the MSME N&N partner on July 4, 2023. MSME N&N has a National Identification Number (NIB) 2102220066773 and is owned by Mrs. Kusniati, who established the business in February 2022. The business employs two production workers and uses simple tools and traditional drying methods. The functional food product produced is cassava crackers made from tapioca flour, which is known for its benefits in aiding digestion and preventing obesity (Yusbarina et al., 2012). In 2022, MSME N&N produced cassava crackers, but over the course of 10 months, the production experienced fluctuations, and monthly sales did not significantly increase. This can be observed in the Table 1.

Table 1. Data on sales of lakar crackers for 2022

Sales of Lakar Crackers for 2022										
Month	Mar	Apr	Mei	Juni	Juli	Agust	Sept	Okt	Nov	Des
Sales (pcs)	300	150	310	205	90	100	295	350	50	289

In addition to the issues mentioned above, there were also challenges related to cassava cultivation and a lack of knowledge about processing cassava into flour. MSME N&N relied on commercially available tapioca flour as the raw material for making cassava crackers, but they faced difficulties in cassava cultivation and processing it into flour.

As a result, the PKM team-initiated activities to address these challenges and provide solutions. They aimed to assist MSME N&N by imparting knowledge and insights on how to process cassava into MOCAF (Modified Cassava Flour) and resolve the issues related to cassava cultivation and flour processing. This assistance was part of the broader effort to enhance the sustainability and product quality of MSME N&N.



Figure 2. Lakar crackers produced by N&N MSMEs

Figure 3. Cassava harvest

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Cassava Plantation Location Survey

On the same day following the visit and site survey of MSME N&N, the PKM team observed the vast cassava plantations in Jatiroke Village. These cassava plantations covered a large area and were predominantly planted with cassava. Cassava harvests in Jatiroke Village occurred every 6 months, but the income from each harvest was quite low, which was not profitable for the farmers.

When the PKM team visited the cassava plantation, it was four months away from the next cassava harvest. The hope is that with the implementation of the PKM activities, cassava in the area can provide a higher market value if the residents of Jatiroke Village process it into MOCAF (Modified Cassava Flour). This could potentially increase the profitability of cassava cultivation for the local community. The PKM activities aimed to empower and educate the community to enhance the value and utilization of cassava as a valuable resource.

The MOCAF flour produced can be sold at a higher price compared to raw cassava. Additionally, MOCAF flour can be utilized by nearby Micro, Small, and Medium Enterprises (MSME) for various products beyond cassava crackers. It can be used in the production of bread, wet noodles, meatballs, martabak, and other types of cakes (Rosmeri et al., 2013). The aim is that, following the implementation of the PKM activities, the community of Jatiroke Village will become more self-reliant and will advance in developing their village and the MSME businesses in the vicinity. This empowerment initiative is designed to contribute to the economic growth and independence of the local community, enabling them to make better use of their resources and expand their entrepreneurial ventures.



Figure 4. Survey of cassava plantation locations

Coordination of PKM Team and Partners

Before conducting the socialization or training, there was a prior coordination and agreement between the PKM team and the partner (MSME N&N) regarding the schedule for the socialization, especially related to the processing of cassava into MOCAF flour. The coordination meeting took place one week before the socialization event. The topics discussed during this coordination included the objectives and the number of participants for the socialization, the location, the methodology, and the theme to be covered.

The result of the agreement between the PKM team and the partner was that the socialization would have the theme "How to Make MOCAF Flour as a Healthy and Hygienic Raw Material for Cassava Crackers at MSME N&N." The target audience for the socialization included the employees of MSME N&N and the cassava plantation owners in Jatiroke Village, numbering approximately 25 individuals, both men and women. The event was scheduled to take place at MSME N&N, and the methodology for the socialization was to be delivered through training. The event was scheduled for Tuesday, July

18, 2023. This coordination ensured that all parties were aligned on the objectives and logistics of the socialization event.



Figure 5. Coordination between the PKM team and partners

Socialization

The socialization event had the theme “How to Make MOCAF Flour as a Healthy and Hygienic Raw Material for Cassava Crackers at MSME N&N.” It took place on July 18, 2023, and was attended by 25 employees of MSME N&N and the cassava plantation owners from Jatiroke Village. The event was held at the MSME N&N premises.

The event began with welcoming remarks from the head of the PKM team and the partner, delivered by the owner of MSME N&N. It was followed by a presentation on the benefits of MOCAF flour and the process of making MOCAF flour by a member of the PKM team.

The advantages of MOCAF flour for health were highlighted, including its safety for individuals with autoimmune diseases, memory loss, and autism. MOCAF flour is free of gluten, which can be harmful to those with autoimmune diseases and cause allergies, unlike regular wheat flour (Dwipayanti et al., 2020; Salim, 2011; Wiranti & Indrawati, 2015). This information aimed to educate the participants on the health benefits of using MOCAF flour in their cassava cracker production and other food products.



Figure 6. Socialization of how to make MOCAF flour

The process of making MOCAF (Modified Cassava Flour) involves several stages, including peeling, washing, slicing, fermentation, drying, grinding, and sieving (Subagio et al., 2008). MOCAF production is carried out using the dry grinding and fermentation method with slaked lime (3.5 ounces of slaked lime are needed for every 30 kg of cassava). It is crucial to prepare the necessary equipment and materials. The cassava used should be ready for harvest and aged between 6 to 10 months to ensure a substantial yield and smooth fermentation (Permatasari et al., 2018; Wiranti & Indrawati, 2015).

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Here is the step-by-step process of making MOCAF: (1) Prepare the necessary equipment and materials for the production process; (2) Peel the cassava; (3) Clean the slimy residue on the cassava surface by soaking it in water mixed with slaked lime overnight; (4) Thinly slice the cassava into chip-like pieces; (5) Soak the slices in clean water for 3 days, changing the water every 24 hours; (6) Drain the soaked cassava slices; (7) Sun-dry the cassava pieces until they reach a moisture content of 10%, or use a drying cabinet; (8) Crush or grind the dried cassava pieces; (9) Sift the crushed cassava to obtain a fine flour. If there are any coarse particles, crush and grind them again; (10) Mix the sifted flour and sun-dry it once more, roast it, or heat it in a drying cabinet until it is thoroughly dry; (11) Store the MOCAF in a tightly sealed plastic container; (12) MOCAF is ready for use (Arsyad, 2016; Gusriani et al., 2021).

The participants in the socialization event were enthusiastic about learning the process and techniques for making MOCAF. This new knowledge provided them with insights into the utilization of cassava to produce MOCAF as a raw material for cassava crackers and other food products. They also gained an understanding of the potential health benefits of using MOCAF in their products.

Final Evaluation

As for the evaluation after the implementation of this PKM, N&N MSMEs implemented the use of MOCAF flour which they processed themselves to become the raw material for lakar crackers. After market testing, consumers liked the taste of lakar crackers prepared using MOCAF flour compared to wheat flour or tapioca flour.



Figure 7. Making lakar crackers using MOCAF flour

The existence of this PKM has had a tremendous impact on the empowerment of the Jatiroke Village Community and N&N MSMEs, one of which is increasing the selling value of cassava into MOCAF flour as a raw material for making healthy and hygienic lakar crackers and can open up business

opportunities for the Jatiroke Village community for production. MOCAF flour so that it can increase family income.

Market Test Results

At the start of marketing and introducing lakar crackers to the public, a market test was first carried out on 10 volunteers by assessing categories such as shape, taste, aroma, savory, color of fried lakar crackers. The assessment is by giving a score of 1-5 with the following criteria: 1 = Strongly Dislike (STS), 2 = Dislike (TS), 3 = Neutral (N), 4 = Like (S), 5 = Very Like (SS) (Putri et al, 2015; Sulistiyo, 2006). The following is a table of data on market test results for 10 volunteers, which can be seen in the Table 2.

Table 2. Market test results for lakar crackers

Volunteer (Alias)	Shape	Taste	Aroma	Gurih-ness	Color
MM	S	S	S	SS	S
AYC	S	S	S	SS	S
TM	S	S	S	SS	S
ITM	S	S	S	SS	S
UL	S	S	S	SS	S
MKD	S	S	S	SS	S
LM	S	S	S	SS	S
KE	S	S	S	SS	S
A	S	S	S	SS	S
J	S	S	S	SS	S

From the results above it can be concluded that the market test results are dominated by the savory category, almost 100% of volunteers really like Lakar crackers because of their savoriness and in the category of shape, taste, aroma and color, 100% of volunteers like Lakar crackers. Based on this, lakar crackers are suitable for commercialization after completing complete legal procedures such as halal and PIRT.

4. CONCLUSION AND RECOMMENDATIONS

The conclusion from this PKM activity is that the use of MOCAF flour as a raw material for cassava crackers in MSME N&N represents a healthy and hygienic innovation for this traditional product. By substituting wheat flour with MOCAF flour, cassava crackers become more nutritious, low in gluten, and suitable for those with gluten intolerance. Furthermore, MSME N&N upholds product cleanliness and safety standards, ensuring that consumers can enjoy cassava crackers with confidence. Therefore, the use of MOCAF flour in cassava cracker production at MSME N&N is a positive breakthrough for healthier and more hygienic traditional Indonesian food.

One of the limitations in this community engagement activity is the limited access and understanding of MSME regarding MOCAF as an alternative raw material. MOCAF, as processed cassava flour with numerous health and hygiene potentials, may not be fully known or understood by MSME owners. Therefore, more intensive outreach and education efforts are needed to ensure that MSME comprehend the benefits and correct usage of MOCAF, thereby improving the quality and safety of

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their processed cassava cracker products. As for recommendations for future community engagement activities, here are three suggestions: (1) Intensive Training: Organize intensive training sessions for MSME owners on the benefits and techniques of using MOCAF flour in the production of healthy and hygienic cassava crackers. This training should focus on crucial aspects such as MOCAF processing, hygiene, packaging, and product quality improvement. Practical guides and examples of implementation should be provided to make it easy for MSME to adopt these practices; (2) Ongoing Monitoring and Support: Provide continuous monitoring and support to MSME after the training to help them overcome any barriers or challenges that may arise during the implementation of MOCAF usage. This way, they can effectively enhance the quality of their products over time; (3) Collaborative Network Development: Facilitate the formation of collaborative networks among MSME involved in using MOCAF as a raw material for cassava crackers. By sharing experiences, knowledge, and resources, MSME can support each other and strengthen their business growth. This network can also help expand the market and enhance the competitiveness of healthy and hygienic cassava cracker products.

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