



The Development of Taro Processed Product in Women Farmers Group in Baru Village, Tabanan Bali Indonesia

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A B S T R A C T

The processing of food products during the pandemic is growing rapidly, resulting in processed products that are increasingly diverse and widespread in the market. To empower rural communities by improving knowledge, attitudes, skills, and behaviors, activities and mentoring programs are needed in accordance with the needs of the community. This community service activity was held in the Group of Women's Farmers "Dharma Santi", Baru Village, Marga Sub district, Tabanan Regency, Bali Province. Taro is an untapped commodity in Baru Village. Processing taro into various products such as bread, jam, and noodles have been produced and marketed by Women Farmers Group, but marketing is still limited around the village. Farmers Group does not have adequate entrepreneurship skills, production management, and marketing. The solution to address partner problems is to provide the right technology for processing bread, jam, and taro noodles, equipment assistance, knowledge of packaging and product labeling, marketing, and entrepreneurship. The implementation of community service activities has been running smoothly. The number of participants who participated in the activity was 10 people. Based on the results of the evaluation, this group mastered the technology of making bread, jam, and taro noodles up to 75%. Further help is needed to the group so that more quality bread products, jams, and taro noodles produced have a longer shelf life as well as wider marketing.

1. INTRODUCTION

1.1. Research Background

Taro (*Colocasia esculenta*) is a tuber plant originating from Southeast Asia that is popular recently. Taro plays an important role in food security in developing countries [1][2]. Taro tubers have health benefits including lowering blood pressure, preventing cell damage, and also supporting thyroid function [3]. Apart from being the main source of starch in food, taro also contains 1.1% of B-complex vitamins and minerals such as potassium, phosphorus, and calcium [4]. Taro is susceptible to damage during storage, therefore an alternative processing process is needed [2]. The processing of taro into bread, jam and noodle products has the potential to be developed [5]. Bread and

jam are some of people's favorite foods today[6][7]. Besides its good taste, jam also has a good nutritional profile [8]. While noodles are foods made by mixing wheat flour, eggs, and water [9][10]. Noodles are easily digested in the human body because they have small starch grains and are non-allergenic [5][11].

The Dharma Santi Women Farmers Group, Desa Baru, Marga Sub district, Tabanan Regency, Bali Province, Indonesia, with 10 members, has carried out activities of making processed taro products for daily needs, with an average group income of 500 thousand per week. Processed taro food that has been produced is usually marketed to markets around the village. Dharma Santi Women Farmers Group hopes that they will have skills and insight in managing natural resources and maintaining wisdom and having an entrepreneurial spirit so that they can open wider business opportunities. The Dharma Santi Women Farmers Group has collaborated in the field of research and service as well

as training with universities, especially Warmadewa University. From the results of these activities, several problems were found and until now these problems have not been resolved due to limited time, cost, knowledge and technology, and available equipment.

Some of the problems faced include: 1) Taro processed food products produced do not vary and need to be improved in quality. 2) Food processing is not based on Good Manufacturing Practice (GMP) and Sanitary Standard Operating Procedures (SSOP) 3) The equipment used in processing, still simple 4) Women Farmers Group has not been skilled in making quality taro processed foods. 5) Knowledge of good packaging techniques is still low. 6) Business and financial management is still very simple. 7) The products they produce have not been widely marketed. Sales are made only on an order basis. This condition is an opportunity as well as a challenge for the Food Science and Technology Study Program of the Faculty of Agriculture to establish more intensive cooperation through international community service activities to help find solutions so that the business that is run can grow and develop. International community service Food Science and Technology Study Program, Faculty of Agriculture, Warmadewa University, Bali, Indonesia in collaboration with Universiti Teknologi MARA (UiTM) Malaysia.

Through the collaboration that will be carried out between Warmadewa University and the Dharma Santi Women's Farmer Group, it is hoped that it can provide solutions to the problems faced. In addition, lecturers and students who are involved in this activity also get practical benefits, have adequate knowledge and skills to open new business opportunities that are more independent. Meanwhile, Warmadewa University and Universiti Teknologi MARA (UiTM) Malaysia. will get a model for the development of science and technology that is aligned and in sync with the needs of the business world and industry.

1.2. Literature Review

Food diversification is an effort to expand people's choices in consumption activities, especially for staple foods based on local resources [13]. The potential of taro as a local food source is expected to be a source of providing non-rice carbohydrate food, diversification of local food consumption to substitute the use of wheat flour and the development of the processing industry is highly expected. Taro is a tuber plant that is commonly found [16]. The main benefit of taro tubers is as a food source of carbohydrates in the form of starch which is quite high. Taro in fresh form without processing is easily damaged and makes transportation difficult [17]. The use of taro tubers as food is still limited, only as food for boiled taro and fried taro. Taro tubers can also be processed into jam, bread and noodles.

Appropriate technology is needed to process taro into products. The innovation of processed products from taro that have the potential to be developed is jam, which is the current favorite food of the community [16]. Jam can be made from pulp or juice, with the addition of sugar and water, and concentrated until it reaches the consistency of jelly [19]. Apart from tasting good, jam also has a good nutritional profile and is consumed with bread. The physicochemical characteristics of jam are largely determined by the basic ingredients. The process of making jam can also be added with thickening agents, citric acid, and food additives. The addition of modified cornstarch makes the jamming system form a smooth and homogeneous network

[20]. Modified starches and food components can be held together by hydrogen bonds, and this provides the heat-resistant characteristics of blueberry jam.

Bread is a staple food prepared from a dough of flour (usually wheat) and water, usually by baking. Throughout recorded history and around the world, it has been an important part of many cultures' diets. It is one of the oldest human-made foods, having been of significance since the dawn of agriculture, and plays an essential role in both religious rituals and secular culture. Bread may be leavened by naturally occurring microbes (e.g. sourdough), chemicals (e.g. baking soda), industrially produced yeast, or high-pressure aeration, which creates the gas bubbles that fluff up bread. In many countries, commercial bread often contains additives to improve flavor, texture, color, shelf life, nutrition, and ease of production. Nowadays, bread has been gaining considerable popularity in many countries, various studies have characterized this type of food [21]. There has been a considerable increase in consumer interest in bread in recent years due to its nutritional, health and technological benefits [22]. Spontaneous fermentation has traditionally been applied to the production of traditional breads that have a distinctive taste and taste in various locations around the world.

Currently, there has been a change in people's lifestyles, especially changes in diet [14]. People tend to choose foods that are fast and practical without considering what content is in the food [15]. One of the foods that is a favorite of the community is noodles. The raw material for making noodles is wheat flour. Consumption of wheat flour continues to increase, so that it will affect the increase in exports of wheat flour. Therefore, we need other materials that can be used as a substitute for wheat flour in the manufacture of noodles. Noodles circulating today are often referred to as incomplete food because of their high carbohydrate content but low in other nutritional content [23]. In order to fulfill the nutritional requirements and functional properties of noodles for the health of consumers, it is necessary to add other food ingredients in their manufacture. The ingredients that can be used to overcome this problem are taro and vegetable extracts.

1.3. Research Objective

The objectives of this community service activity include: 1) Increasing the income of the Dharma Santi Women Farmer Group and the utilization of taro into several products of economic value such as bread, jam, and noodles. 2) Help provide appropriate technology for processing bread, jam, and noodles from taro. 3) Help provide knowledge about good packaging and labeling. 4) Help provide knowledge about marketing and entrepreneurship. 5) Help facilitate the manufacture of bread, jam, and taro noodle processing equipment so that the processing can run well, more efficiently in time and according to SOPs and can increase profits

2. MATERIALS AND METHODS

2.1. Materials and Equipment

The raw material used is taro (*Colocasia esculenta*) with a harvest age of 6 months, which is obtained from Baru village. Additional ingredients such as flour, sugar, yeast, chicken eggs, corns tarch are obtained from shops around the Marga sub-district. The equipments used are noodle printing machines, ovens, and several other types of equipment.

2.2. Implementation

The implementation of PKM activities is carried out in several stages, namely: 1) Site survey for the implementation of extension activities and processing processes. 2) Interviews and questions and answers about the problems faced by partners, as well as planning activities to find solutions to the problems faced. 3) Partners are given materials that have been prepared by the team in the form of modules for processed food products made from taro, given counseling on sanitation and hygiene in processing, packaging and labeling, marketing, entrepreneurship, and business management. 4) Problems in the production sector are overcome by handing over equipment to partners to support taro food processing as well as training on the implementation of GMP and SSOP

Partner participation in the implementation of PKM activities is needed for the smooth running of the activation process, namely: 1) Partners are expected to comply with all agreements that have been made. 2) Partners are expected to be disciplined and seriously carry out all series of activities until all activity plans end. The manufacture of processed taro products is divided into 3 products. The Food Science and Technology Study Program, Faculty of Agriculture, Warmadewa University provides one processed product of taro, namely the manufacture of taro noodles, and two other products provided by the University of Technology Mara Malaysia, namely taro jam and taro bread.

3. RESULT AND DISCUSSION

3.1. Result

The community service program activity with the title Taro Processed Product Development at the Dharma Santi Farmer Women's Group in Tabanan Baru Village, Bali, Indonesia, has been running smoothly. The activity was carried out in the form of counseling or theoretical studies to provide an understanding of appropriate technology materials for processing bread, jam, and taro noodles, providing equipment assistance, providing knowledge about product packaging, labeling, marketing, and entrepreneurship. (Figure 1). The activity then continued with hands-on practice of making bread, jam, and taro noodles. The participants who attended this activity were 20 people from the Dharma Santi Village Women Farmer Group. The extension team also donated tools and materials for making bread, jam, and taro noodles. This community service activity has been published on electronic media.

The Community Partnership Program activity with the title "Development of Product Variations and Marketing of Taro Processed Women's Farmer Group Dharma Shanti Desa Baru" has been running well and smoothly. The activity was held on Saturday 9 October 2021 in the form of an extension webinar or theoretical study to provide an understanding of the material for developing variations of bread, jam, and taro noodles. Packaging techniques, marketing techniques, and strategies for how to make products that consumers like are also presented. The activity then continued with hands-on practice of making bread, jam, and taro noodles. The participants who attended this activity were 10 people from the Dharma Shanti Farmer Women's Group. The

extension team also donated ovens, noodle presses, and materials for making bread, jam, and taro noodles.

This community service activity has been published in the electronic mass media. This international community service activity is carried out by the Food Science and Technology Study Program, Faculty of Agriculture, Warmadewa University, Indonesia in collaboration with the Mara Technology University, Malaysia. The implementation of this activity involved several lecturers from Warmadewa University and two lecturers from the Universiti Teknologi MARA (UiTM) Malaysia.

The implementation of the Dharma Shanti Desa Baru Women's Farmer Group's activities can be seen in Figure 1. The implementation of an international webinar between Warmadewa University Indonesia in collaboration with Universiti Teknologi MARA (UiTM) Malaysia can be seen in Figure 2.



Fig. 1. . Implementation of the Dharma Shanti Women Farmer Group Activities at Baru Village



Fig. 2. International webinar held between Warmadewa University Indonesia Collaborating with University of Technology Mara Malaysia

Training and socialization are carried out with the practice of making food products to increase the family's economic income. Knowledge of food processing sanitation is carried out because food processing is a very influential factor in the quality of food served to consumers. Partners have used masks, gloves, aprons, and head coverings during the processing. Thus, it is expected that the food products produced will be of higher quality in terms of food safety [12].

The benefits obtained from this PKM activity are in terms of Economic and Social Impact. The group gains skills in the development of bread, jam, and taro noodles. Of the 10 people group of 8 people have mastered the manufacturing technology so that 75% can make bread products, jams, and taro noodles. In

addition, the benefit in terms of partners' contributions to implementers is that partners are very enthusiastic about participating in the training process. All partners (100%) actively participate in direct practice in activities and partners expect continuous assistance in the development of bread, jam, and taro noodle products. The implementation of this PKM activity increased the turnover from Rp. 500,000 per week to 1,500,000 per week. From 1 product to 3 kinds of processed taro products. Various processed taro products can be seen in Figure 3.



Fig. 3. Bread, jam, and noodles of taro products

There is an increase in sales turnover of processed taro products by the partner group of the Dharma Shanti Desa Baru Women Farmer Group compared to before conducting PKM activities. Bookkeeping with a simple system has begun with the recording of raw materials, processing costs, packaging, and labels so that the group knows the benefits obtained. The increase in turnover and product quantity can be seen in Figures 4 and Figure 5.

3.2. Outcomes:

In detail, the outcomes achieved from this community service activity include: appropriate technology, mass media publications, videos of activities and bread products, jams, and taro noodles.

3.3. Benefits

The group gains skills in the development of bread, jam, and taro noodles. Of the 20 people in the group, 16 people have mastered the technology of making bread, jam, and taro noodles, so 75% can make bread, jam, and taro noodles well.

3.4. Partner's contribution to implementation

Partners are very enthusiastic about participating in the training process. All partners (100%) actively participate in direct practice in activities and partners expect continuous assistance in the development of bread, jam, and taro noodle products.

3.5. Implementation of Community Service

3.5.1. Inhibiting factors

In the implementation of service activities, the inhibiting factor is the condition of the Covid-19 Pandemic. This condition makes it difficult to find a schedule for carrying out activities due to strict health protocols.

3.5.2. Supporting factors

The supporting factor in this activity was the group's great desire to participate in further training on the development of

bread, jam, and taro noodles which are healthy and have a long shelf life. In addition, during the covid-19 pandemic which has made tourism quiet, members can earn additional income by producing bread, jam, and taro noodles and selling them online.

3.5.3. Solution and follow-up

Obstacles encountered in the implementation of service can be overcome by communicating with group leaders and village officials. Counseling activities and direct practice can take place smoothly on Saturday 9 October 2021 which was attended by 20 group members. The activity was carried out following the Covid-19 prevention health protocol. Furthermore, the service team will continue to assist in the development of bread, jam, and taro noodles products to obtain Certificate of Household Industry (P-IRT).

3.5.4. Strategic steps for further realization

The strategic steps to realize the next plan are assisting the group in managing the P-IRT and assisting in completing the administration so that the P-IRT can be owned by the group.

4. CONCLUSION

The conclusion that can be drawn from this activity is that community service activities have been running smoothly. The group has mastered the technology for making bread, jam, and taro noodles up to 75%. It is recommended that this activity be carried out continuously and assist the group so that quality bread, jam, and taro noodles are produced with a longer shelf life. The group is also expected to have a p-IRT business license. to be able to independently make coffee skin jam and be able to market it.

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