

TRAINING IN CASSAVA PROCESSING TECHNOLOGY INTO VARIOUS FUNCTIONAL FOODS

Asmawati¹⁾, Dina Soes Putri^{2)*}, Syirril Ihromi³⁾, Arman Maulana⁴⁾, Siti Nurazizah⁵⁾, Meli Apriana⁶⁾, Hana Nita Isnaini⁷⁾

Universitas Muhammadiyah Mataram

¹⁾asmawtiraba@gmail.com, ²⁾putri_dinasoes@ummat.ac.id, ³⁾syirrilihromi@ummat.ac.id,
⁴⁾armandm799@gmail.com, ⁵⁾snorazizah09@gmail.com, ⁶⁾mellyapriana3@gmail.com,
⁷⁾hananitaisnaini7@gmail.com

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Abstract

Cassava is a local commodity that can be processed into functional food. Functional food is defined as a food or drink that provides nutrients for the body while simultaneously maintaining a healthy body. Although there has been a long tradition of processing cassava into traditional snacks, the decreasing interest of consumers, especially young people, in traditional snacks makes it necessary to innovate products. For instance, the processing of cassava into contemporary products such as nuggets, sponge cake, and tapai drinks. The objective of this community service activity is to educate partners regarding the necessity of consuming functional food, particularly from local commodities such as cassava, and to instruct partners on the processing of cassava, which is abundant in their area, into various functional food products with commercial value. The partners of this activity were members of the West Lombok 'Aisyiyah Regional Leadership (PDA), a total of 16 women. The service activity is divided into three sessions: functional food counselling, cassava processing practice, and practice using sealers to package products. Prior to and following the activity, participants were administered a test to assess the impact of the service activity on their knowledge and skills in processing functional food and packaging products. The results of the pre- and post-test data processing indicate that there have been significant changes (32.5% improvement) in the participants' knowledge. Furthermore, the results of the observations of the participants' practical activities demonstrate that all participants have been able to process cassava into a variety of contemporary functional food products with a selling value and have become proficient in using cup and hand sealers.

Keywords: Cassava, Functional Food, Processing Technology

*Penulis Koresponden: Dina Soes Putri (putri_dinasoes@ummat.ac.id)

Abstract. Singkong merupakan salah satu komoditas lokal yang bisa diolah menjadi pangan fungsional. Pangan fungsional merupakan makanan atau minuman yang tidak hanya dapat memberikan nutrisi bagi tubuh, namun juga sekaligus dapat membantu menjaga kesehatan tubuh. Meskipun telah banyak olahan singkong sebagai panganan tradisional, namun makin berkurangnya minat konsumen, khususnya anak muda, pada jajanan tradisional maka dianggap perlu untuk melakukan inovasi produk. Misalnya mengolah singkong menjadi aneka produk kekinian seperti nuget, bolu, dan minuman tapai. Tujuan dari kegiatan pengabdian pada masyarakat ini adalah untuk mengedukasi mitra terkait urgensi mengkonsumsi pangan fungsional, khususnya dari komoditas lokal seperti singkong, serta mengajarkan mitra dalam mengolah singkong yang melimpah di daerahnya menjadi aneka produk pangan fungsional bernilai jual. Mitra kegiatan ini adalah anggota dari Pimpinan Daerah 'Aisyiyah (PDA) Lombok Barat yang berjumlah 16 orang wanita. Kegiatan pengabdian ini terbagi ke dalam 3 sesi acara: penyuluhan pangan fungsional, praktik pengolahan singkong, dan praktik penggunaan sealer untuk mengemas produk. Sebelum dan sesudah kegiatan, peserta diberikan test untuk melihat pengaruh kegiatan pengabdian ini terhadap pengetahuan dan keterampilan peserta dalam mengolah pangan fungsional dan mengemas produk. Berdasarkan hasil olah data pre- dan post-test dapat disimpulkan bahwa ada perubahan yang signifikan (peningkatan 32,5%) terhadap pengetahuan peserta. Selain itu, berdasarkan hasil observasi terhadap aktivitas praktik peserta, terlihat bahwa semua peserta telah mampu mengolah singkong menjadi aneka produk pangan fungsional kekinian yang bernilai jual serta telah mahir menggunakan alat pengemas gelas dan standing pouch.

Kata-kata Kunci: Pangan Fungsional, Singkong, Teknologi Pengolahan

INTRODUCTION

Food is the most important basic need of every human being and a human right whose fulfilment is guaranteed by the state. Based on Indonesian Law No. 18/2012, food is defined as everything that comes from life and water, whether processed or not, that is intended as food and drink for human beings. The urgency of food for life is even included in 5 of the 17 Sustainable Development Goals: (2) Zero Hunger, (3) Healthy and Prosperous Lives, (12) Responsible Consumption and Production, (14) Marine Ecosystems, and (15) Terrestrial Ecosystems. The link between food and healthy living is that food is used not only as a source of energy and to support normal human growth and development, but also plays an important role in maintaining human vitality. The type of food that can play a role in improving human health is called functional food (Putri, Saputrayadi, Marianah, & Muliatiningsih, 2021). Examples of functional foods include golden rice, fermented foods (such as tempeh, natto and kimchi), yoghurt, etc.

Functional foods are divided into 2 groups based on their source, namely plant-based functional foods and animal-based functional foods (Putri et al., 2021). Plant-based functional foods can be derived from fruits, vegetables, spices, herbs and other plants. Indonesia has an abundance of functional food ingredients, but unfortunately most people do not understand the importance of these foods for the health of the body, so more people entrust their health to chemical drugs or food supplements. One example of a local food with high functional activity is Moringa leaves. Moringa leaves are widespread throughout Indonesia

and are easily found in rice fields and plantations. Abroad, this plant is known as a super food because of its complete nutrition and high functional activity. Even the WHO is using Moringa to overcome the problem of malnutrition and stunting in Africa (Etikawati, Sutarno, Sugiyarto, Rosyadi, & Ardo, 2022). This plant has become very expensive abroad due to its properties, but is undervalued domestically due to a lack of knowledge about functional foods. Another example of a functional food ingredient that is abundant in Indonesia and has a low selling price is cassava.

Indonesia is the fourth largest producer of cassava in the world (<https://kominform.jatimprov.go.id/read/umum/indonesia-negara-penghasil-singkong-terbanyak-keempat-dunia>). Unfortunately, this commodity has not yet made a significant contribution to national economic development or community welfare (<https://mediaindonesia.com/nusantara/128782/singkong-berpotensi-dorong-industri-nasional>). Although cassava was once a staple food during the colonial era. However, since welfare began to improve, more people now choose to consume rice rather than cassava. Whereas cassava has lower calories and glycemic index and higher fibre content (Defri, Nurhamzah, Natasyari, Lestari, & Putra, 2022). There are various processed cassava products known in the community, but unfortunately the consumption of local wisdom-based snacks is now beginning to decline due to the proliferation of various modern foods based on sugar and wheat flour. There is therefore a need to diversify processed cassava so that more people consume local functional foods with preferred flavours.

The purpose of this community service activity is to educate the community about local functional food and to teach them the technology of processing local functional food, namely cassava, into various products that can be sold to increase the family income of Pimpinan Daerah 'Aisyiyah (PDA) West Lombok members. Cassava was chosen for this service activity because this plant is one of the superior commodities of West Nusa Tenggara province. Unfortunately, not many diversified cassava products are sold in this province.

The West Lombok PDA has 40 members spread over 4 branches: Tanak Tepong, Narmada, Gunungsari and Labuapi. The profile of the members consists of working women, housewives and women entrepreneurs (MSMEs). One of the problems in the West Lombok PDA area is that there is an abundance of agricultural products such as cassava and bananas, but the local people do not know how to process them into high-value products.

METHOD

The method used in this community service is Participatory Action Research (PAR) (Aryani et al., 2022). Here, partners will be actively involved in this service activity. The

partner of this community service is West Lombok PDA. The leader of the partner plays a role in preparing the activity venue, preparing processing tools and informing this activity to its members.

This community service programme is divided into 3 main agendas: counselling on local functional foods, training in local food processing technology (cassava) into various functional foods with selling value, and product packaging training. Before the activity began, the partners are first given a pre-test to measure their initial skills and later the pre-test results are compared with the post-test results to see the percentage of knowledge absorbed by the partners during the service activities (Mahfud, Gumantan, & Nugroho, 2020). This activity was held on the Friday and Saturday of the 8th and 9th of March 2024 at the West Lombok PDA Hall and was attended by 16 participants. The flow chart of the stages of this service activity can be seen in Figure 1.

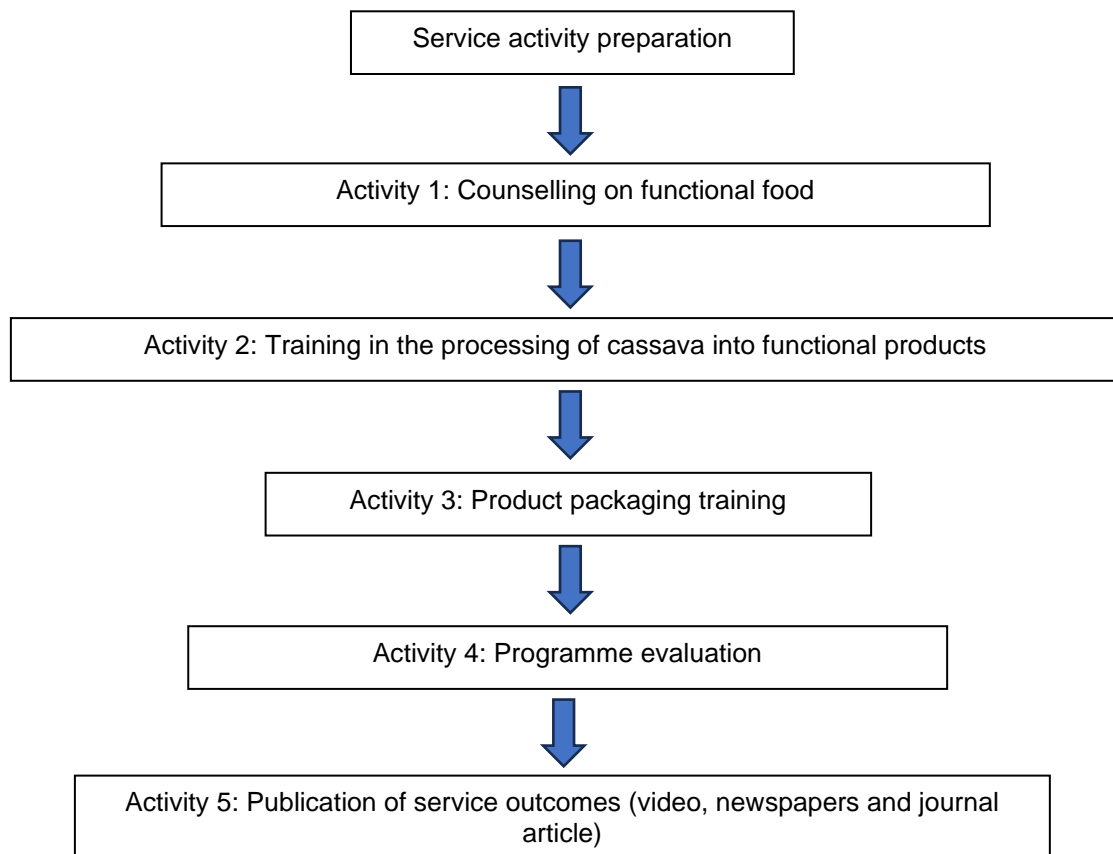


Figure 1. Flow chart of community service stages

1. Functional food counselling

This activity educated partners about functional foods, including definitions, benefits, sources and examples of functional foods made from various local food ingredients that have been marketed abroad, such as moringa tea, porang flour and

others. In general, ordinary people do not understand the importance of consuming functional foods, especially local foods, to improve human health. There are many examples of local foods that have various benefits and are well known to foreigners, but Indonesians themselves do not really understand their health benefits, so their consumption is not too routine, for example, moringa, which is one of the super foods (Affini, Setyorini, Aini, & Zaidah, 2021) used globally as one of the foods to prevent stunting (Amelia et al., 2023); seaweed, which is also rich in various macromolecules and micromolecules that are important for children's growth and development, such as protein, fibre, vitamins and minerals (Peñalver et al., 2020), so it is also good to consume to prevent stunting; and so on. Although Indonesia, especially the province of West Nusa Tenggara (NTB), has been able to export moringa and seaweed to other countries, unfortunately there are still many stunting rates in this province. Functional food counselling was presented by the head of the service team, who is a lecturer in the Functional Food course and has experience as a resource person.

2. Training on processing cassava into various functional foods with selling value

In this service activity, cassava is processed into 3 types of functional foods that can later be consumed personally or sold to increase the income of the partner family. The processed products chosen are the types of products that are still rarely sold in the Lombok market, so that they can become new sales ideas that can be sold in the market. This activity was led by Mr Syirril Ihromi. The preparations made in this service activity are cassava sponge cake, cassava nuggets and Tapai drinks. The recipes for the three preparations are given in full in the service activity booklet.

3. Product packaging training

Once the products were made, the partners were taught how to package their products properly, such as how to choose the right packaging and how to create attractive packaging. In addition, the partners were directly taught how to use a vacuum sealer to seal plastic packaging. In addition to preventing contamination of foodstuffs, the utilisation of a sealing agent, in particular one that is compatible with a vacuum, will extend the shelf life of the product, thereby ensuring its longevity within its packaging (Darajat, Murdika, Repelianto, Yulianti, & Herlinawati, 2023). The vacuum sealer was then given to the partners. The packaging activity was conducted by Mrs Dina Soes Putri.

4. Activity evaluation

Activities are evaluated by looking at the results of participants' pre- and post-tests, participant satisfaction questionnaires, and direct discussions with partners about problems they still have that can later be used as a topic for service activities at the next opportunity.

5. Publication of community service outputs

This service activity has been publicised through videos uploaded to the youtube channel and instagram reel, and through online newspaper publications in the SuaraNTB and NTBSATU publishing houses. In addition, this activity will also be published in a SINTA accredited journal.

RESULT AND DISCUSSION

Result

This community service activity comprises theoretical (material provision) and practical (cassava processing and product packaging) sessions. Prior to the commencement of the event, participants were administered a pretest. Subsequently, at the conclusion of the event, a posttest was administered to the same participants. Following the administration of the pretest, the event was officially inaugurated by the chairperson of the West Lombok PDA, Mrs Siti Rohaeni (Figure 2). Thereafter, the event proceeded with counselling and question-and-answer sessions, practical sessions, and a closing ceremony.



Figure 2. Opening speech by PDA West Lombok Leader

1. Functional food counselling

Prior to being furnished with material pertaining to functional food and cassava, participants were first subjected to a test to ascertain their baseline knowledge. The responses to these questions are included in the material that will be discussed during counselling session presented by Mrs Asmawati, the head of the community service team. The counselling activities proceeded smoothly and enthusiastically, with the active participants asking questions in the Q&A session. The documentation of the counselling activities is presented in Figure 3.



Figure 3. The delivery of counselling material.

2. Training on processing cassava into various functional foods with selling value

For the practical session, the participants were divided into two large groups. One group was tasked with making nuggets and sponge cake, while the other group attempted to make Tapai (fermented products made from cassava) drinks. All participants were actively involved in this activity, guided by a team of lecturers and students. Documentation of the products made by the participants during the activity can be seen in Figure 3.



Figure 3. Products made from hands-on session

3. Product packaging training

In addition to being taught cassava processing technology, the participants were also taught how to use cups and hand sealers to package plastic cups and standing bags. There were 2 hand sealers to try out, a regular sealer and a vacuum sealer. The difference is that the vacuum sealer can remove air from the pack, further extending the shelf life of the product, and is very suitable for packaging semi-wet products and other products that are easily damaged by the presence of air (Prasetya et al., 2023), such as nuts. At the end of the activity, the three types of sealers used during the practice were handed over to the head of the partner and the participants. Documentation of the practice of processing and using the sealer can be seen in Figure 4.



The process of making cassava sponge and nuggets



The process of making Tapai drink



Practise using a cup sealer



Practise using a hand sealer

Figure 4. Documentation of cassava processing practices and use of packaging sealers

4. Activity evaluation

The assessment of this service activity employs the Kirkpatrick method at the second level (learning), which gauges the extent to which participants demonstrate comprehension of the material provided. To assess the increase in partner understanding, test questions are provided prior to and following the presentation of related material.

The pretest was conducted by asking all participants to complete a questionnaire in the form of questions about the activity material. The questions were prepared in the form of a multiple choice of 10 questions. This was followed by the delivery of the material by the team and the practice of making different preparations using cassava raw materials, and finally a post-test session for the participants using the same questions as in the pre-test to determine the increase in the participants' knowledge of the material that had been delivered. Data on the questions, the percentage of correct answers and the level of knowledge of the participants before and after the delivery of the material can be seen in Tables 1 and 2.

Discussion

The results of the post-test and pre-test were processed using Microsoft Excel in order to ascertain the changes in participants' knowledge before and after counselling. The efficacy of the training programme was evaluated using the gain score, defined as the difference between the post-test and pre-test scores. A positive gain score indicates that the post-test value is higher than the pre-test, which is the desired outcome for the service team and indicative of the programme's success (Sulfaidah, Al Banna, Sapinah, & Liana, 2023). The processed data from the test results can be found in Tables 1 and 2.

As evidenced by the data presented in Table 1, the participants' original knowledge of functional food and cassava were relatively limited. In particular, the percentage of correct responses to questions 3, 4, and 6 was very low, at 18.75%, 6.25%, and 12.5%, respectively. Following the provision of counselling material and cassava processing practices, there was a notable increase in the participants' knowledge, with percentages rising to 100%, 87.5%, and 93.75%. This demonstrates that the counselling activity was effectively implemented (Ariyanti, Sariyani, & Utami, 2019), resulting in a significant enhancement (gain score positive) of the participants' cognitive knowledge (Sandika, Wijaya, & Pratama, 2019).

A person's knowledge is influenced by a number of factors, including information, education, occupation, age, interest, experience and culture (Zukmadini, Karyadi, & Kasrina, 2020). The high assessment results of participants after the delivery of material and practice compared to the pretest results were due to the delivery of material with simple and easy-to-understand language and the use of props in the form of posters, pictures and animations that were adjusted to the material presented. Furthermore, participants were also given the opportunity to provide feedback in discussion and question and answer sessions. As Setiawan et al. (2021) have demonstrated, this method of delivering material is more

effective than traditional methods because it facilitates the comprehension of the material presented, leading to an increase in participants' knowledge.

Table 1. The summary of the gain scores achieved by the participants in the test

NO	Question	Participants with correct answers		
		Pretest (%)	Posttest (%)	↑ (%)
1.	What does healthy food mean?	75	87.5	12.5
2.	How to identify unhealthy foods?	87.5	100	12.5
3.	Do you know the contents of cassava?	18.75	100	81.25
4.	Do you know about bioactive compounds?	6.25	87.5	81.25
5.	What do you know about antioxidants?	62,5	68.75	6.25
6.	Do you know about functional food?	12.5	93.75	81.25
7.	A product is considered a functional food if ...	87.5	87.5	0
8.	Is cassava and its processed products a product that can nourish the body?	81.25	93.75	12.5
9.	What are the most common compounds in cassava?	56.25	81.25	25
10.	What are some processed cassava products that can improve family income and economy?	87.5	100	12.5
	average	57.5	90	32.5

The data presented in Table 2 also clearly demonstrates the improvement in participants' basic knowledge levels before and after the delivery of the material. Prior to the educational intervention, 25% of participants demonstrated a lack of understanding, 62.5% demonstrated partial understanding, and 12.5% demonstrated full understanding. Following the educational intervention, there was a notable increase in the proportion of participants who demonstrated an understanding of the material. In particular, the proportion of participants who demonstrated a lack of understanding of the material following the intervention decreased from 25% to 0%. Furthermore, the proportion of participants demonstrating an understanding of the material also decreased from 62.5% to 18.75%. On the contrary, the proportion of participants demonstrating a high level of understanding of the material increased from 12.5% to 81.25%, a significant improvement. This suggests that the counselling had a positive impact on the participants' knowledge. This is also in accordance with the findings of Hirsan et al. (2021), which stated that the efficacy of an activity can be gauged by analysing the post-test results of the participants to ascertain the extent to which their knowledge has been absorbed following the service.

Table 2. Level of knowledge of the respondents about the contents, the processing and the processed manioc products

Variable	Category	Score	Total respondents (%)
Pre-counselling knowledge	Very well understood	80-100	12,5
	Understood	60-79	62,5
	Not well understood	≤60	25
After-counselling knowledge	Very well understood	80-100	81,25
	Understood	60-79	18,75
	Not well understood	≤60	0

The community service activity was generally conducted in an orderly and smooth manner. All participants engaged in the activity from its inception to its conclusion with enthusiasm, as evidenced by their active participation in providing feedback through questions, discussions, and practices. Based on the results of discussions with participants (partners), it is hoped that in the future, there will be more community service activities like this so that West Lombok PDA members can always improve their abilities in an effort to increase their family income. For instance, the provision of capacity-building training for MSME players among partner members may be considered.

CONCLUSION

A team of lecturers and students from the Department of Food Processing Technology of Universitas Muhammadiyah Mataram has been engaged in community service activities in collaboration with the West Lombok PDA. The event was attended by 16 women participants, comprising administrators and members of the West Lombok PDA. The programme comprised three elements: functional food counselling sessions, the processing of cassava into various functional food products with a selling value, and product packaging practices. The results of the data processing of the pre- and post-test scores indicate that the service activity was successful in increasing the partner's knowledge related to functional food. Furthermore, the participants were able to produce a variety of processed cassava products, including nuggets, sponge cake, and tapai drinks. They also demonstrated proficiency in using cup, hand, and vacuum sealers. The enthusiasm and potential of the partners were evident, and it was therefore deemed necessary to implement further service activities that could foster MSME actors and prospective new entrepreneurs, with the objective of improving the economy of the families of PDA West Lombok members.

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