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Increasing the Added Value of Morage Leaf into Processed Food Products By Pkk Merta Nadi Banjar Lantagidung, Gianyar, Bali

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A B S T R A C T

The majority of Br. Lantangidung's population are farmers and silversmiths. Some inhabitants cultivate Moringa plants as a source of daily nutrition. During the pandemic, food items are being processed at a rapid rate, resulting in increasingly diversified and ubiquitous processed foods on the market. To empower rural communities by expanding their knowledge, attitudes, skills, and behavior, activities and mentorship programs must be tailored to the community's need. Merta Nadi Br. Lantangidung, Sukawati District, Bali Province, PKK women performed this community service. Moringa leaves are an underutilized resource in Brazil. Lantangidung is a processed food item. PKK women have processed Moringa leaves into a variety of goods, including chips and Moringa leaf noodles, and marketed them, although marketing is still restricted in Banjar. PKK women lack the necessary business, production management, and marketing abilities. The solution to partner issues is to supply the proper technology for processing Moringa leaf chips and noodles, as well as equipment help, product packaging and labeling skills, and marketing expertise. The execution of community service tasks has been proceeding without incident. The number of individuals that participated in this activity was ten. According to the findings of the evaluation, this group mastered the technology for producing chips and Moringa leaf noodles to a level of 100 percent. The organization need further support so that the resultant Moringa leaf chips and noodles are of a higher quality, have a longer shelf life, and are more widely marketed.

1. INTRODUCTION

1.1. Research Background

The location of Batuan Village is in Sukawati District, Gianyar Regency, Bali Province. Batuan village is a usually low-lying territory that stretches from north to south and has more than 410 hectares. According to the aforementioned statistics information, Batuan Village is a rural agricultural region. In addition, Batuan Village is administratively split into seventeen official banjars / hamlets. Batuan Village is bounded by Batuan Kaler Village to the north, Sukawati Village to the south, Central Singapadu Village to the west, and Kemenuh Village to the east [1]. To highlight community empowerment in Batuan Village, Sukawati District, Gianyar Regency, particularly in Br. Maintaining local knowledge in the food industry is the job and responsibility of all involved parties. The Location Plan for Br. Lantangidung is depicted in Figure 1.

As part of long-term economic development efforts, agricultural-based industrial development in a broad sense must have strong links with other sectors and have a broad impact on increasing added value, providing employment opportunities and utilization, and developing processing technology through mutually beneficial activities between producer farmers. in conjunction with the processing industry and rural economic development [2]. The majority of Br. Lantangidung's population are farmers and silversmiths. Some inhabitants cultivate Moringa plants as a source of daily nutrition.The benefits and efficacy of the Moringa oleifera plant are found in all parts of the plant, including leaves, stems, roots, and seeds. Moringa leaf is one part of the Moringa plant that has been widely studied for its nutritional content and uses. Moringa leaves are very rich in nutrients, including calcium, iron, protein, vitamin A, vitamin B, and vitamin C [3]. Therefore, it is necessary to provide training to be able to improve skills to increase income in the home industry. One of them is by providing training in the manufacture of processed Moringa leaf products.

According to study conducted by Ref. [4], Moringa trees are often found in Indonesia, and its leaves are rich in nutrients, high in protein and vitamins, and free of antinutrients. In addition, Ref. [5] concluded that the administration of Moringa leaf extract (Moringa oleifera) at a concentration of 2-6 cc/100 cc of drinking water can significantly increase egg weight, the number of eggs, hen-day production, efficient use of rations, and egg yolk color in Lohmann Brown chickens aged 30 to 40 weeks. On the other hand, it decreases the fat and cholesterol content of chicken eggs dramatically.

In addition, Br. Lantangidung is already renowned as a tourist destination, therefore it has the potential to become a food market. This condition presents an opportunity for the community to process its agricultural goods, one of which being Moringa leaves that may be turned into Batuan Village-specific souvenir food products. This time, our target audience is the spouses of PKK member Merta Nadi Br. Lantangidung, who are not yet economically active but have a great ambition to become business owners. In addition, it may be utilized as a secondary source of income that helps to boost household income.

Traditional goods are produced with poor levels of cleanliness and hygiene, utilize raw materials of low quality or freshness, food safety is not guaranteed, technology has been used for centuries, and enterprises are run by families with insufficient management skills [6]. Consequently, it is vital to develop conventional food processing with some enhancement attempts by employing fundamental food processing feasibility. Aspects of quality management and the safety of raw materials and finished goods must be investigated for company and product marketing growth [7]. To create quality traditional snacks, it is important to apply the fundamental feasibility of GMP (Good Manufacturing Practice) and SSOP (Sanitation Standard Operating Procedure) because to the difficulty of diverse processing procedures for traditional snacks.

With community service activities funded by Warmadewa University, it is hoped that the residents of Br. Lantangidung, Batuan, Sukawati will have the knowledge and skills to manage local natural resources and the entrepreneurial spirit to create business opportunities related to the Batuan Village environment. It is believed that by offering post-harvest technical training and transforming Moringa leaf processed goods into Moringa leaf chips and Moringa leaf noodles, the community would be able to create and market their processed products, hence enhancing family income and welfare.

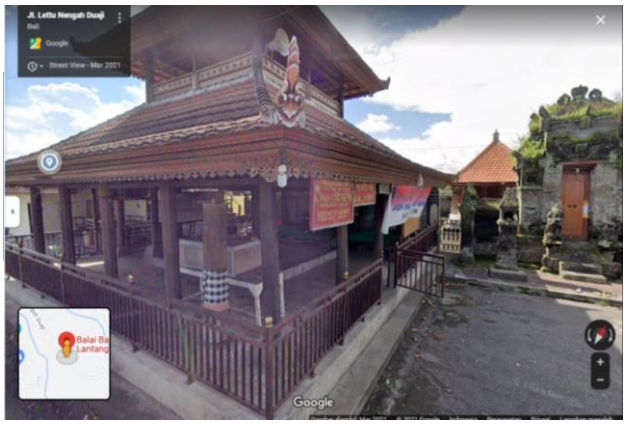

Figure 1. Location Plan of Br. Lantangidung

1.2. Literature Review

Moringa (*Moringa oleifera*) is a type of tropical plant that has grown and developed in Indonesia. All parts of the Moringa plant can be used as food and medicine [8]. From the results of research [9] conducted counseling on the use of Moringa leaves as a component of complementary foods for breast milk (MPASI) to the community in Padukuhan Morobangun, Jogotirto, Berbah, Sleman, Yogyakarta. This counseling is filled with the provision of materials, training, and assistance in the manufacture of complementary foods in the form of baby cookies and pudding with Moringa leaf flour components.

Moringa contains antioxidant activity compounds and can be used as an alternative to natural antioxidants. Almost all parts of the Moringa plant from roots, bark, sap, leaves, fruit, flowers, seeds, and seed oil have been used traditionally to treat various diseases [10]. Moringa leaves are used traditionally in treating jaundice, rheumatism, aches and pains, chicken blindness, eye pain, purulent wounds, allergies, difficulty urinating, ringworm (herpes), canker sores, and body fatigue [11]. Moringa roots, leaves, and flowers are used in traditional medicine for the treatment of diarrhea and hypertension [10]. Root powder used as an aphrodisiac, when mixed with milk, has properties to treat asthma, gout, rheumatism, and enlarged spleen or liver [12]. Moringa also has many pharmacological activities such as anticancer [13], antiallergic [14], antibacterial [15], antioxidant [16], anti-inflammatory [17], immunomodulatory [18], antidiabetic [19], antifungal [20], hepatoprotective [21]. Moringa roots and leaves have been reported to have antispasmodic effects [22].

1.3. Research Objective

The objectives of this community service activity include: 1) Providing Appropriate Technology in processing Moringa leaves. 2) Provide knowledge about good processing, sanitation and hygiene processing, packaging and product labeling, storage, and marketing. 3) Provide knowledge on the application of the basic feasibility of GMP (Good Manufacturing Practice) and SSOP (Sanitation Standard Operating Procedures) to produce quality Moringa leaf chips and noodles. 4) Improve skills in making processed chips and Moringa leaf noodles of high quality. 5) Providing equipment and business capital assistance so that the types of processed chips and Moringa leaf noodles become more diverse.

2. MATERIALS AND METHODS

2.1. Materials and Equipment

The raw material used is Moringa Leaf, which is taken around Br. Lantangidung, Batuan, Sukawati. Additional ingredients such as rice flour, tapioca flour, salt, eggs, water, garlic, coriander, cooking oil, candlenut, coconut milk, and powdered broth were obtained from shops around Br. Lantangidung, Batuan, Sukawati. The equipment used are pots, blenders, pans, basins, spatulas, noodle cutters, scales, and several other types of equipment.

2.2. Implementation

The implementation of PKM activities is carried out in several stages, namely: 1) Interview and discussion methods to be able to find out the problems experienced by partners. 2) The face-to-

face method and provide direct counseling so that partners gain knowledge about Moringa leaf product processing, entrepreneurship, and business management. 3) Direct practice, which is guided by instructors who are competent in their fields and students, so that partners can make directly the products provided. 4) Problems in the production sector are overcome by handing over equipment to partners to support the processing of processed candied ginger and instant ginger as well as training on the implementation of Good Food Processing Methods (CPMB/GMP) and Hygiene Sanitation (SSOP) (Figure 2).

Participation of partners in the implementation of Community Service requires activities for smooth activation of the process, namely: 1) Partners are expected to comply with all agreements and carry out all series of activities with full discipline until all series of Community Service activities end. 2) Partners who become participants in the training are expected to comply with all agreements that have been made in accordance with the statement letter of willingness to cooperate in this Community Service activity. 3) After the Community Service activity ends, partners are expected to be able to continue their business well and practice the technology package that has been improved and the business that was initiated can develop. 4) When this Community Service activity is over, partners are expected to be able to pass on their skills to other community members to take advantage of the enormous potential of coconut in Banjar Lantangidung, Batuan Village, Sukawati District.

3. RESULT AND DISCUSSION

3.1. Result

The community service program activity has been running smoothly. These activities are carried out in the form of counseling or theoretical studies to provide an understanding of appropriate technology for processed products of chips and Moringa leaf noodles, provide equipment assistance, and provide knowledge about product packaging, labeling, marketing, and entrepreneurship. The activity then continued with the direct practice of making processed moringa leaf noodles and chips. There were 10 participants who took part in this activity from the Merta Nadi Br Empowerment and Family Welfare Group (PKK). Lantangidung. The extension team also donated tools and materials to make processed products of chips and Moringa leaf noodles.

Moringa leaves have the potential to be used as raw materials in the cosmetic industry, medicines, and probiotic drinks for health, or are added to food as a fortificant (nutrients) to enrich their nutrition. Secondary metabolites in Moringa leaves can be obtained by extraction [23]. Moringa leaves contain vitamin C which is 220mg/100g [24]. This community service activity has been published on electronic media. The Community Partnership Program activity with the title "Increasing the Added Value of Moringa Leaves into Processed Food Products by Family Welfare and Empowerment (PKK) Merta Nadi Banjar Lantangidung, Gianyar Bali Regency" has been running well and smoothly. The activity was carried, in the form of training and hands-on practice to provide material understanding to develop variations of processed Moringa leaf chips and noodles. Packaging techniques, marketing techniques, and strategies for how to make products that consumers like are also presented.

Figure 2. Implementation of training activities and practice of making Moringa leaf chips and noodles.

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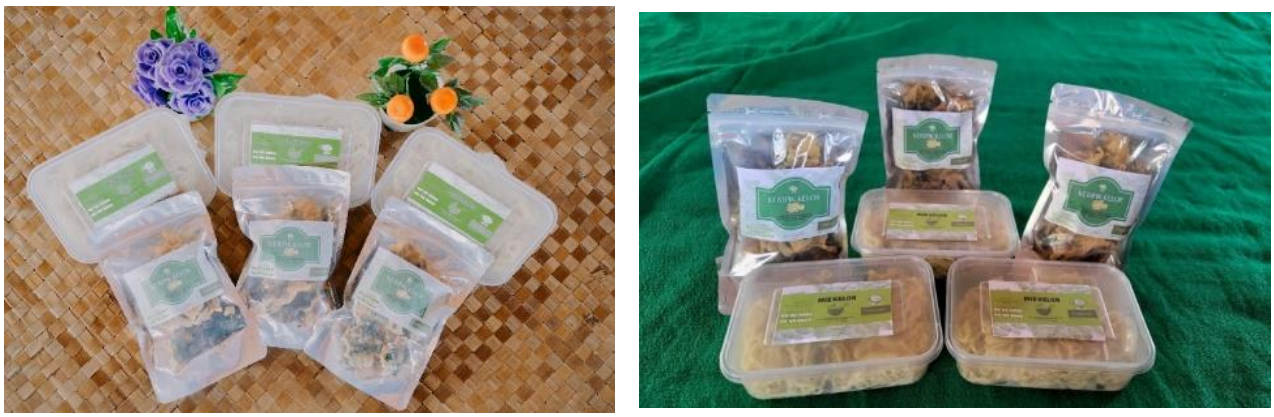

Figure 3. Processed products of Moringa leaf noodles and chips.

The activity was then continued with the direct practice of making processed Moringa leaf noodles and chips. The participants who took part in this activity were 10 people from the Empowerment and Family Welfare (PKK) Merta Nadi Br. Lantangidung. The extension team also donated tools and materials to make chips and Moringa leaf noodles. This community service activity has been published in electronic mass media. The implementation of this activity involved 3 lecturers from the Food Science and Technology Study Program, Faculty of Agriculture, Warmadewa University.

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 processing. Thus, it is hoped that the resulting food products will be of higher quality in terms of food safety. The benefits obtained from this Community Service activity are in terms of Economic and Social Impacts. The group acquires skills in the processing of chips and Moringa leaf noodles. Of the 10 groups of participants, all participants have mastered manufacturing technology so 100% of them can make Moringa leaf chips and noodles. In addition, the benefit in terms of partners' contribution 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 Moringa leaf chips and noodles. Various processed products of chips and Moringa leaf noodles can be seen in Figure 3.

3.2. Outcomes

In detail, the results achieved from this community service activity include appropriate technology, mass media publications, activity videos, and processed products of moringa leaf noodles and chips.

3.3. Benefits

The group acquired skills in the development of candied ginger and instant ginger. Of the 10 groups of participants, all participants have mastered the technology of making Moringa leaf chips and noodles, so 100% can make Moringa leaf noodles and chips 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 sustainable assistance in the development of processed products of Moringa leaf chips and noodles.

3.5. Implementation of Community Service

3.5.1. Inhibiting factors

In the implementation of Community Service (PkM), the inhibiting factor is the difficulty of finding a schedule for implementing activities in the busyness of the community because of the many traditional activities in the village making it difficult to agree on an implementation schedule.

3.5.2. Supporting factors

Family Empowerment and Welfare (PKK) Merta Nadi Banjar Lantangidung, Gianyar Regency Bali is very enthusiastic to find out how to process Moringa leaf technology into various innovative products such as Moringa leaf noodles and Moringa chips. Participants independently have been willing to practice making Moringa noodles and Moringa chips until they start marketing.

3.5.3. Solution and follow-up

The obstacles faced in implementing Community Service (PkM) can be overcome by communicating with group leaders and village officials. Extension activities and direct practice can take place smoothly on Saturday, May 28, 2022, which is attended by 10 group members. The activity was carried out in accordance with the Covid-19 prevention health protocol.

3.5.4. Strategic steps for further realization

Furthermore, the Community Service (PkM) team will continue to assist in processing Moringa leaves into various other innovative products. The next plan is for the implementation team to plan to assist the group to seek P-IRT permits so that the product can be marketed more widely. Strategic steps to realize the next plan are how to make labels and proper packaging on processed Moringa products as preparation for applying for permits at the Health Office (P-IRT).

4. CONCLUSION

Community service activities have been running smoothly. Family Empowerment and Welfare (PKK) Merta Nadi Banjar Lantangidung has been able to independently apply Moringa leaf processing technology and has produced Moringa leaf noodles and Moringa chips. Partners by 100% have knowledge of good processing, processing, packaging, and labeling of simple products, broader marketing, entrepreneurship, and business management.

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REFERENCE

[1] Indira Laksmi., Sita Prameswari., Warastra Patni Iswari. 2018. *Generasi Muda Batuan Bisa (Berkarya, Inovatif, Sehat dan Aktif)*. Lembaga Penelitian dan Pengabdian Kepada Masyarakat. Universitas Udayana. Denpasar.

[2] Luh Suriati, I.G.P. Mangku, Luh Kartini. 2019. *Aneka Olahan Talas di Desa Wanagiri*. Universitas Warmaedwa. Denpasar.

[3] Misra, S., & Misra, M. K.,.2014. *Nutritional evaluation of some leafy vegetable used by the tribal and rural people of south Odisha, India*. Journal of Natural Product and Plant Resources, 4, 23-28.

[4] Mutayoba, S.K., E. Dierenfeld, V.A. Mercedes, Y. Frances and C.D. Knight, 2011. Determination of chemical composition and ant-nutritive components for Tanzanian locally available poultry feed ingredients. Int. J. Poult. Sci., 10: 350-357.

[5] Siti, Ni Wayan dan Gde Bidura, I Gusti Nyoman. 2017. *Pemanfaatan Ekstrak Air Daun Kelor (Moringa Oleifera) Terfermentasi Melalui Air Minum Untuk Meningkatkan Produksi Dan Menurunkan Kolesterol Telur Ayam.* Fakultas Peternakan, Universitas Udayana. Denpasar.

[6] Irianto, H.E. dan I. Soesilo. 2007. *Dukungan Teknologi Penyediaan Produk Perikanan. BAdan Riset Kelautan dan Perikanan.* Departemen Kelautan dan Perikanan. Seminar Nasional Hari Pangan Sedunia. Bogor.

[7] Suharna, C., L. Sya'rani, T.W. Agustini. 2006. *Kajian system Manajemen Mutu Pada Pengolahan Ikan Jambal Roti di Pengandaran kabupaten Ciamis*. Jurnal Pasir Laut. Vol. 2 No.1. tahun 2006. Hal 13-25.

[8] Putra, I. W. D. P., Dharmayudha, A. A. G. O., & Sudimartini, L.M. (2016).Identifikasi Senyawa Kimia Ekstrak Etanol Daun Kelor (Moringa oleifera L) di Bali. *Jurnal Indonesia Medicus Veterinus*, 5(5), 464-473.

[9] Budiani, D. R., Muthmainah, Subandono, J., Sarsono, & Martini. (2020). Pemanfaatan Tepung Daun Kelor (*Moringa oleifera*) sebagai Komponen Makanan Pendamping ASI (MP-ASI) Padat Gizi. *Jurnal Abdidas*. Vol. 1, No. 6.

[10] Anwar F, Latif S, Ashraf M, & Gilani AH. 2007. *Moringa oleifera*: a food plant with mul-tiple medicinal uses. *Phytother. Res*, 21: 17–25.

[11] Hariana A. 2007. *Tumbuhan Obat dan Khasiatnya Seri II*. Jakarta: Penebar Swadaya.

[12] Padayachee, B., and H. Baijnath, 2012. An Overview of The Medical Importance of Moringaceae.J. Med. Plants Res. 6(48):5831-5839.

[13] Parvathy MVS & Umamaheshwari A.2007. Cytotoxic effect of *Moringa oleifera* leaf extracts on human multiple myeloma cell lines. *Trends Med. Res*, 2:44–50.

[14] Madaka F &Tewtrakul S. 2011. Antiallergic activity of some selected plants in the genus *Boesenbergia* and *Kaempferia*. *J. Sci. Technol*, 33: 301–304.

[15] Moyo B, Masika PJ, & Muchenje V. 2012a. Antimicrobial activities of *Moringa oleifera* Lam leaf extracts. *Afr. J.Biotechnol*, 11: 2797–2802.

[16] Moyo B, Oyedemi S, Masika PJ, & Muchenje V. 2012b. Polyphenolic content and antioxidant properties of *Moringa oleifera* leaf extracts and enzymatic activity of liver from goats supplemented with *Moringa oleifera* leaves/sunflower seed cake. *Meat Sci*, 91: 441–447.

[17] Cheenpracha S, Park EJ, Yoshida WY, Barit C, Wall M, Pezzuto JM, & Chang LC. 2010. Potential anti-inflammatory phenolic glycosides from the medicinal plant *Moringa oleifera* fruits. Bioorg. *Med. Chem*, 18: 6598–6602.

[18] Sudha P, Syed S, Asdaq SMB, Dhamingi S, & Chandrakala GK. 2010. Immunomodulatory activity of methanolic leaf extract of *Moringa oleifera* in animals. *Indian J. Physiol. Pharmacol*, 54: 133–140.

[19] Jaiswal D, Rai PK, Kumar A, Mehta S, & Watal G. 2009. Effect of *Moringa oleifera* Lam. leaves aqueous extract therapy on hyperglycemic rats. *J. Ethnopharmacol*, 123: 392–396.

[20] Chuang PH, Lee CW, Chou JY, Murugan M, Shieh BJ, & Chen HM. 2007. Antifungal activity of crude extracts and essential oil of *Moringa oleifera* Lam. *Bioresour. Technol*, 98:232–236.

[21] Buraimoh AA, Bako IG, & Ibrahim FB. 2011. Hepatoprotective effect of ethanolic leave extract of *Moringa oleifera* on the histology of paracetamol induced liver damage in Wistar rats. *Int. J. Anim. Vet. Adv*, 3:10–13.

[22] Aney JS, Tambe R, Kulkarni M, & Bhise K. 2009. Pharmacological and pharmaceutical potential of *Moringa oleifera*: a review. *J. Pharm. Res*, 2:1424–1426.

[23] Aminah A, Maryam S, Baits M, & Kalsum, U. 2016. Perbandingan Aktivitas Antioksidan Ekstrak Etanol Daun Sirsak (*Annona muricata* L.) Berdasarkan Tempat Tumbuh Dengan Metode Peredaman DPPH. *Jurnal Fitofarmaka Indonesia*, *3*(1): 146–150.

[24] Alverina, C,. Andari D., & Prihanti G, S. (2016). Pengaruh pemberian ekstrak daun kelor (*moringa oleifera lam*.) Terhadap sel kardiomiosit pada tikus putih (*rattus novergicus strain wistar*) dengan diet aterogenik. *Jurnal: Fakultas Muhammadiyah Malang. Vol. 12. No. 1*.