Production of JeKo Candy (Jeli Kelor) as an Effort to Prevent Stunting in Lengkese Village, Takalar Regency

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ABSTRACT

Moringa plant is one of the plants that can be found in Lengkese Village, District, Takalar Regency. There is a Takalar Regency government policy that requires every house to plant at least 1 moringa plant for 1 house so that this plant is easy to find in the yards of the houses of the Lengkese Village community. It is known that Moringa leaves are plants that have many benefits, one of which is as an alternative to improve the nutritional status of malnourished children, overcome malnutrition, and increase the amount of milk production in nursing mothers. Some of the obstacles faced by the people of Lengkese Village, Takalar Regency as our community service partners include: (1) Activities in the Lengkese Village community who have free time that has not been used for productive activities, (2) Processing, The community in Lengkese Village only uses Moringa leaves as hedges which are left attached to the terraces of the house. Through this community service program, we facilitate partners through counseling, training/assistance, and fostering the production of JeKo (Moringa Jelly) candy as an effort to prevent stunting (malnutrition). The specific target achieved from the application of community science and technology through this training is an increase in understanding, knowledge and skills of group partners, partners are able to produce packaged and labeled JeKo products equipped with partner identities.

Keywords: Moringa leaf; jelly candy; stunting; lengkese village

1. BACKGROUND

Takalar Regency, South Sulawesi Province has plants that contain many benefits for public health and contain very high nutrients ranging from macronutrients to micronutrients. One of the plants in Takalar Regency that can be utilized both as food and medicine is the Moringa plant (Moringa oleifera L.). One of the benefits that can be taken from the Moringa tree is in its leaves. Moringa leaves have various nutritional contents that are very beneficial for health such as phenols, calcium, iron, phosphorus, magnesium, zinc, protein, vitamin A, vitamin B, vitamin C, and ascorbic acid which are higher than other vegetables. Moringa leaves contain vitamin C equivalent to vitamin C in 7 oranges, vitamin A equivalent to vitamin A in 4 carrots. And a variety of amino acids in the form of aspartic acid, glutamic acid, alanine, valine, leucine, isoleucine, histidine, lysine, arginine, venylalanine, tryptophan, cysteine and methionine[1] and one of the most prominent of moringa leaf content is antioxidants including tannins, steroids, triterpenoids, flavonoids, saponins, interquinones, and alkaloids.[2]

Takalar Regency is a regency in South Sulawesi province, Indonesia. Its capital is located in Patallassang. The district has an area of 300,853 people. Takalar Regency is geographically located in the southern part of South Sulawesi Province at a distance of 40 km from the Makassar Metropolitan City with an area of 566.51 Km2, which consists of a forest area of 8,254. Takalar Regency has 10 sub-districts, 24 villages and 76 villages. Takalar District is one of 10 districts in South Sulawesi that contribute to the high stunting rate in South Sulawesi. The percentage of stunted toddlers becomes a public health problem if the prevalence is ≥20% (Data and Information Center of the Indonesian Ministry of Health, 2016). The percentage of stunting incidence in Takalar Regency reached 44% in 2018 and decreased to 25% in 2019 (DHO Takalar 2019). Stunting is a chronic malnutrition problem caused by insufficient nutritional intake for a long time due to feeding not in accordance with nutritional needs. Stunted children are an indication of a lack of nutritional intake, both in quantity and quality that is not met. These conditions result in children having a height that tends to be short for their age, and even malnutrition at an early age can increase infant and child mortality rates (Ministry of Finance, 2018). According to data from the Lengkese Village Posyandu, in 2021 there were toddlers in 143 families, stunted toddlers in 13 families, and members with disabilities in 15 families. The stunting rate in Lengkese Village tends to be higher among other villages.

Moringa (Moringa oleifora) is a fast-growing plant and is very tolerant of extreme climates and as an alternative to food substitutes available odd season if the availability is relatively limited because the fruit and leaves can be stored as nutritious food ingredients.[3] Various types of vitamins (A, C, E, K, B1, B2, B3, B6), flavonoids, alkaloids, saponins, tannins, and terpenoids are active substances contained in moringa leaves that have the potential as a source of antioxidants.[11] In moringa leaves, 15 types of macro and micro minerals were found including P, S, K, Ca, Ti, Cr, Mn, Fe, Ni, Cu, Zn, Mo, Sr, Ba, and Re with consecutive levels of 12.84; 23.45; 264.96; 603.77; 1.05; 1.52; 2.68; 20.49; 22.60; 7.59; 2.87; 11.69; 14.52; 10.04; and 13.62 mg/100g with the highest mineral content in moringa leaves is calcium and potassium.[12]

Based on the description above, the benefits of moringa leaves can be used as an additional source of livelihood seeing the potential of moringa leaves that grow in the Lengkese Village area, so we try through this community science and technology application program (PIM) to provide information to community partners in Lengkese Village through counseling, training / mentoring, and coaching. We help partners in the process and procurement of production equipment, and help to package according to market conditions and help market their products at the provincial and even national levels, so that this group can be productive in producing JeKo (Moringa Jelly) candy in a sustainable manner.

2. METHOD

2.1 Solution and Target Outputs

Based on the background, the community service trying to build innovation of moringa leaves as a new product for the local community – help them in the producing JeKO (Moringa Jelly) candy.

2.2 Location of Implementation Activities

Implementation time is March 2022 in Lengkese Village, Mangarabombang District, Takalar Regency.

2.3 Activity Method

The implementation method applied to the implementation of this PIM activity program is the provision of science and technology training / assistance to the people of Lengkese Village, Takalar Regency. Determination of partners using purposive sampling method, namely non-productive village communities. To determine the effectiveness of training and mentoring carried out, before and after training and mentoring activities, pre-test

and post-test and questionnaires were given to participants.

The method used in training is the participatory training method, which involves as much as possible the participation of partners in lectures, discussions, and practice of design and creation of works. The program that has been agreed with partners is carried out with the following methods: (1) Training and assistance in making/producing JeKo (Jeli Kelor) candy, (2) entrepreneurship training (business management, marketing, and finance). For this reason, a design is needed which includes the implementation of activities and program evaluation. The design of the implementation of activities and program evaluation is as follows:

1. Activity Implementation Plan:

a. Preparation: activities include

- Beginning with socialization activities to partners and the local village government about the PKM activity program that will be carried out in Langkese Village, Takalar Regency.
- Determining one person as a field coordinator to facilitate coordination during the activity
- Meeting with the chairman and several members of the partner group to discuss the PIM activity program schedule and agreed together with the activity implementation team
- Socializing partners who will participate in activities, namely in the preparation and preparation of training materials/modules/materials

b. Provision of mentoring training

- Assistance/training on JeKo candy production techniques, which are carried out jointly by partners and the PIM implementation team. The PIM implementation team acts as a director in making products made together with partners. Furthermore, this JeKo candy product was decided together to be a new product to be marketed. The type of product is JeKo (Moringa Jelly) candy.
- Assistance in planning the product packaging design / design offered by the PIM implementation team to partners for consideration. If the packaging design has been approved, the packaging will be made and then used in product packaging.
- Business management training, production techniques, marketing strategies and financial management.

c. Procurement of equipment

To carry out this PIM activity, the next implementation is the procurement of equipment needed in the production and packaging of JeKo candy.

2. Activity evaluation

After carrying out training activities from the entire series of activity programs, participants

will be evaluated:

- At the beginning of the program, participants are trained and assisted to make JeKo candy products.
- At the end of the program, participants are individually required to make the products of the training in the form of JeKo candy products that have been agreed upon.
- Partner communities that are considered successful in absorbing and transferring the knowledge and skills that have been provided through this PIM program are given rewards in the form of products and banners that are used as temporary storage and promotion of the products that have been produced.

3. RESULT AND DISCUSSION

Moringa (Moringa oleifera) is a plant with many benefits, one of which is the roots of the Moringa oleifera plant can fertilize the soil.[6] Moringa leaves are ovoid with flat leaf edges and small in size and compound in one stalk. Moringa leaves are rich in nutrients, including calcium, iron, protein, vitamin A, vitamin B and Vitamin C. Young moringa leaves are light green in color and turn dark green in old leaves. Old moringa leaves can be used as powder or extract.[7] People in Lengkese Village usually use moringa leaves as a complement in daily cooking as processed vegetables such as clear vegetables and fresh vegetables, not even a few who make moringa leaves only as a hedge plant that is left attached to the terraces of the house. Utilization and processing of moringa leaves have not been widely carried out in Lengkese Village. This is due to the lack of public knowledge about the benefits of moringa leaves for health, lack of knowledge and enthusiasm of the community in utilizing moringa leaves, even though the Regent of Takalar district made a policy that requires each house to plant moringa trees at least 1 house 1 tree. For this reason, there is a need for innovation in processing moringa leaves into a product that can be accepted by the community so that the nutritional content in moringa leaves can be utilized by the body.

Moringa leaves can be made into powder to facilitate its utilization as a functional food ingredient. Not only that, moringa leaves that are dried into powder have more nutritional content than when the plant is in the form of raw leaves. Trees for life, which is an organization in America reported that per gram of dried moringa leaves (powder) contains 10 times more vitamin A than carrots, 17 times more calcium than milk, 25 times more iron than spinach, 9 times more protein than yogurt, and 15 times more potassium than in bananas (Thurber & Fahey, 2009). The provision of moringa leaf extract can also improve nutritional

status when viewed from BMI / age of toddlers. Moringa leaf extract can increase the average BMI of toddlers by 0.13. Moringa leaf extract is an additional food for toddlers that can be recommended for parents. Giving additional food is expected to improve the nutritional status of toddlers.[9] By processing moringa leaves into snack foods that are liked by all groups, it will increase the utilization of moringa leaves in the community so that the nutritional content and other benefits contained in moringa leaves can be absorbed by the body. We have an innovation that is the utilization of moringa leaf powder in the form of jelly candy. Jelly candy is one type of snack that is favored by almost all age groups, especially children. Jellied candy is favored because of its sweet taste and also its unique texture. In addition, jelly candy can be processed with a variety of variations both from raw materials, flavors, colors, and also interesting shapes. This type of confectionery snack can replace lost energy quickly.[10]

The overview of science and technology implemented to partners is:

1. Conducting counseling on the utilization of leisure time and knowledge about the benefits of moringa leaves as a material that can be processed into a product of high economic value. From the results of this counseling, it can be seen that the community has increased about the utilization of moringa leaves as one of the plants that can be used as health candy (Moringa Jelly). This is evidenced by the enthusiasm of the participants in the question session and when sharing impressions and messages. In addition, this can also be seen from the questionnaire that we gave to partners before the training and after the training, there was a very significant difference in scores (pretest: knowledge level score 40, posttest: knowledge level score 90).
2. Procurement of production aids that will support the manufacturing and packaging processes that can be used as inventory for selected partner groups to continue to improve the results and sustainability of this service.
3. Assistance on the processing of prospective products, namely JeKo (Moringa Jelly) candy. From the results of the assistance, 500 JeKo candy products were produced. Partners are very enthusiastic in this process because in addition to improving their skills, they also think that they can generate additional income if this product has obtained a license from the relevant agencies.

The following is the procedure for processing the product:

- Sample preparation by collecting moringa leaves that have been collected from the source (residents' homes), then the wet sorting process is carried out and then washed using running

water, after which the sample drying process is carried out by putting moringa leaves in a simplisia oven at 40 ° C for 1 day, after drying the moringa leaf sample is then pulverized with a 4/18 mesh sieve.

- Processing: Moringa leaf powder is dissolved in water with the proportion of water moringa powder is 1:5. Furthermore, jelly candy is made by boiling a mixture of water, sugar, and glucose syrup until it reaches a temperature of 80-90°C. Then the dissolved moringa powder mixture was added and stirred evenly until it reached a temperature of 100-110°C. After that, gelatin that has been dissolved with water (70°C) is added to the jelly candy solution and stirred gently. When the temperature drops to 90°C citric acid is added and then essences and coloring are added to taste so that the color of the resulting candy is more attractive. The jelly candy that has been poured into the mold is stored at room temperature (27°C) by covering it with aluminum foil for 24 hours. Finally, the candy was removed from the mold and coated with tapioca flour and sugar flour that had been roasted beforehand in a ratio of 1: 1.
- Packaging: Once the product is ready, we make the packaging as attractive as possible in order to increase marketability and consumer interest in our products.
- Marketing is carried out in accordance with predetermined market segments. To expand marketing, promotional media is needed to provide information to consumers in an updated manner (Facebook and Instagram).
- The last stage is a total evaluation of everything related to JeKo Candy in the form of expenses and income, marketing strategies, capital and networks to find out what are the shortcomings of this business process.

DRAWINGS, ILLUSTRATIONS AND PHOTOS

The distance between the partner location and the Makassar College of Pharmacy is ± 51.8 km with a travel time of 1 hour 40 minutes. Lengkese Village, Takalar Regency is located in the South of Makassar City, South Sulawesi Province.

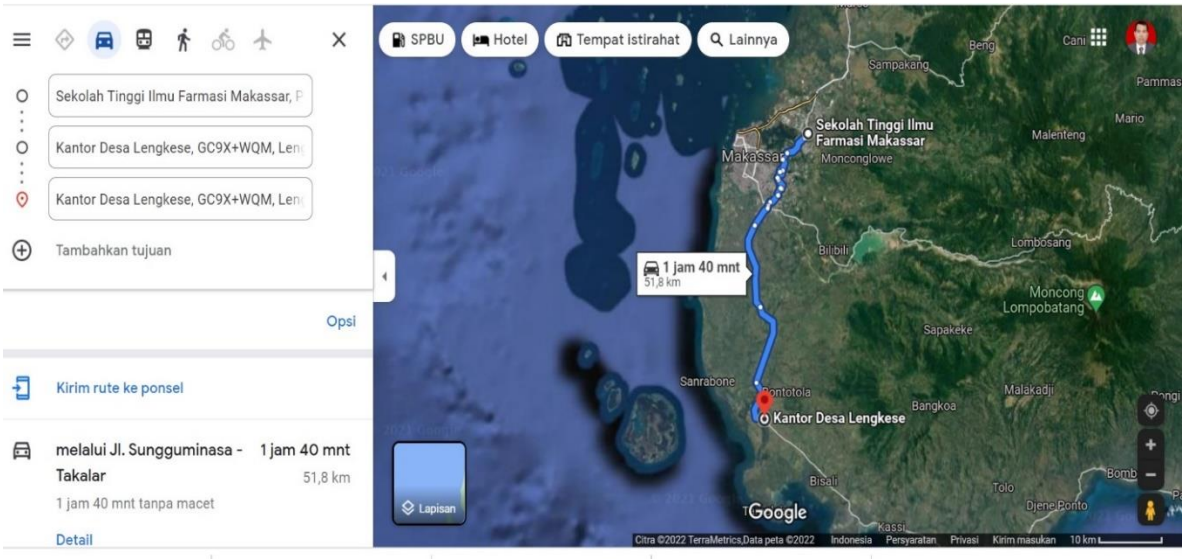

Figure 3.1. Partner Location Map

Figure 3.2. Documentation of Takalar Regent's policy of Planting Moringa Trees

Figure 3.3. Partner approval of the Head of Lengkese Village Office

Figure 3.4. JeKo (Jeli Kelor) candy products

Figure 3.5. JeKo (Jeli Kelor) Candy Packaging Label

4. CONCLUSION AND SUGGESTIONS

The application of Community Science and Technology that has been carried out can increase the understanding, knowledge and skills of group partners. In addition, partners are able to produce packaged and labeled Jeli Kelor (JeKo) candy products equipped with partner identity.

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REFERENCES

1. Kou X, Li B, Olayanju JB, Drake JM, Chen N. Nutraceutical or Pharmacological Potential of Moringa oleifera Lam. Nutrients.2018. 12;10(3):343. doi: 10.3390/nu10030343. PMID: 29534518; PMCID: PMC5872761.
2. Kouevi, K.K. A Study on Moringa oleifera leaves as a supplement to West African Weaning Foods, Hamburg: University of Aplied Science. 2013.
3. Kementrian Kesehatan Ri. Profil Kesehatan Indonesia. Jakarta. 2016.
4. Dinas Kesehatan Kabupaten Takalar. Profil Kesehatan Kabupaten Takalar. 2019.
5. Kementrian Keuangan. (2018). Penanganan Stunting Terpadu Tahun. Direktur Anggaran Bidang Pembangunan Manusia dan Kebudayaan. Jakarta. 2018.
6. Ginting, N., Ginting, N., Aulia, D, N., Hidayati, J. Utilization of Moringa (Moringa Oleifera) as A Multi Function Plant for Conservation Land in Lumban Suhi-Suhi Village, Samosir Regency. Journal of Saintech Transfer (JST). 2018.Vol 1 No 2 .
7. Aminah, S., Ramdhan, T., Yanis, M. Kandungan Nutrisi dan Sifat Fungsional Tanaman Kelor (Moringa Oleifera). Buletin Nutrisi Kelor, Vol. 5, No. 2. Balai Pengkajian Teknologi Pertanian Bogor. 2015.
8. Thurber, M.D. & Fahey, J.W.Adoption of Moringa Oleifera to Combat Undernutrition Viewed Through The Lens of the “Diffussion of Innovations” Theory. Ecol Food Nutr. 2009. 48(3), 212–225. Diakses dari www.ncbi.nlm.nih.gov/ pubmed/20161339.
9. Rahayu, T, B., Nurindahsari, Y, A, W. Peningkatan Status Gizi Balita Melalui Pemberian Daun Kelor (Moringa oleifera). Jurnal Kesehatan Madani Medika. 2018. Vol 9 No 2.
10. Tamer, C.E., Incedayi, B., Copur, O.U., & Karmea, M. A Research n The Fortification Application for Jelly Confectionery. Journal of Food, Agriculture, and Environmental. 2013. 11(2), 152–157. Diakses dari www.world-food.net/aresearch-on-the-fortifi cation-application-forjelly-confectionery/
11. Kurniasih. 2013. Khasiat danManfaat Daun Kelor Untuk Penyembuhan Berbagai Penyakit. Cetakan I. Pustaka Baru Press.Yogyakarta.
12. Manggara, A. B., & Shofi, M. 2018. Analisis kandungan mineral daun kelor (Moringa oleifera Lamk.) menggunakan spektrometer XRF (X-Ray Fluorescence). Akta Kimindo. 3(1):104-111