

Procurement of Equipment to Support Vegetable Ice Cream Production for Residents of Duwet Village, Kec. Tumpang Kab. Malang

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Abstract

This community service (PKM) program aims to improve the production field which is identified as having weaknesses in the vegetable ice cream producing community of Duwet Village, Tumpang District, Malang Regency. The partner's problem that can be identified from the production sector is the production support equipment that is still not fully available. The priority solution provided was training on hygienic production processes using the donated equipment in the form of a freezer and blender. The results of this activity are proven to improve the quality and quantity of vegetable-based ice cream produced by residents. Suggestions from this service activity are 1) increase the number of production equipment in line with the increasing demand for vegetable ice cream. 2) It is necessary to develop innovative ice cream products with other vegetable-based ingredients such as carrots, spinach, or pumpkin which also have high nutritional value. 3) It is necessary to develop branding and marketing strategies to introduce vegetable ice cream to a wider market. 4) Counseling on more efficient production techniques, business management, and product development should be conducted regularly. 5) In order to maintain product quality consistency, it is recommended that program beneficiaries implement a quality management system. 6) It is necessary to establish a Joint Business Group (KUB) that is responsible for the production, management, and marketing of vegetable ice cream.

Keywords: Community Service, Vegetable Ice Cream, Procurement.

1. Introduction

Duwet Village, located on the western slopes of Mount Bromo, Semeru, and Tengger, has an area of 799.216 hectares with a topography of medium plains to hills and an altitude between 700 and 1500 meters above sea level. Administratively, the village borders Benjor Village to the north, Duwet Krajang Village to the south, Tulusbesar Village to the west, and the buffer zone of Bromo-Tengger-Semeru National Park to the east. Based on BPS data in 2019, rainfall in this village ranged from 1103 to 2216 mm (BPS, 2020). Duwet Village is also one of the partner villages of Politeknik Negeri Malang, which is marked by a memorandum of understanding between the village and Politeknik Negeri Malang (Memorandum of Understanding No: 470/372/35.07.16.2013/2020).

The majority of Duwet Village residents, around 80.96%, work in the agricultural sector (Badan Pusat Statistik Kabupaten Malang, 2022), with geological conditions that support agricultural activities such as growing coffee, fruits, and vegetables. In addition, Duwet Village



residents also develop home-based businesses, one of which is making vegetable ice cream made from mustard greens and tomatoes. This diversification of processed vegetables is considered an innovative effort in promoting healthy living, considering that ice cream is a popular snack food in various circles.

Green mustard used as an ice cream base has a high β -carotene content, which is beneficial for preventing myopic disease (*xerophthalmia*) (Syarif & Flaning, 2013). In addition, mustard greens also contain *glucosin phytochemical* compounds that can help prevent prostate cancer (Fadmawati et al., 2019). Unfortunately, although this vegetable ice cream innovation has great potential, the production process is still carried out using simple equipment, and has not been equipped with specialized equipment such as blenders and cooling machines, so hygiene and production efficiency are still a challenge.

Based on the observation, the problems faced by the residents of Duwet Village were identified as follows:

1. The vegetable ice cream production process has not fully met hygiene standards.
2. The production equipment used is still inadequate, especially related to the need for blenders and special cooling machines to improve production quality and quantity.

With the community service program, equipment grants and training are needed for Duwet Village residents to increase the production of vegetable ice cream so that it can become a source of additional income and utilize local vegetables that are often wasted during the harvest due to low selling prices.

2. Methods

The community service program (PkM) in Duwet Village, Tumpang Subdistrict, Malang Regency, aims to improve vegetable ice cream production through equipment grants and training on the use and maintenance of the equipment. The training also covered hygienic production, as the partners previously faced problems with limited equipment such as blenders and freezers, as well as a lack of awareness of hygiene in the production process. PkM provides solutions through equipment grants, training on usage, and provision of aprons and gloves to support more hygienic production.

The methods used in this activity include:

- a. Production Support Equipment Grant: PkM provides production equipment, namely freezers and blenders to improve the quality of vegetable ice cream production.
- b. Knowledge Transfer: Training and guidance are provided regarding the use of the donated equipment, as well as hygienic production procedures.
- c. Discussion and Q&A: Participants are given the opportunity to ask questions and discuss, strengthening understanding and relationships between PkM implementers and Duwet villagers.
- d. Problem Discussion: PkM implementers assisted Duwet villagers in a formal but not patronizing way, delivering the material clearly and politely.

The evaluation of PkM activities was conducted in three stages:

- a. Pre-Activity Evaluation: Interviews and discussions were conducted with Duwet villagers to identify difficulties faced in the vegetable ice cream production process, including technical barriers and equipment needs.
- b. Evaluation During Activity: The evaluation covers the absorption of the material by Duwet villagers, the perceptions formed, and support for the material presented.

Questionnaires were used to assess the perceptions and attitudes of Duwet villagers regarding the implementation of PkM.

- c. End of Activity Evaluation: The acceptance and rejection of the PkM proposal by Duwet villagers was analyzed, including factors influencing their perceptions and attitudes. Conclusions are drawn regarding the benefits and contributions of PkM to the Duwet villagers and its suitability to the institution's objectives. This program is expected to increase the capacity of Duwet Village residents in producing vegetable ice cream hygienically and sustainably, and have a positive impact on improving the local economy.

3. Results and Discussion

3.1. Realization of Problem Solving

The results of the initial survey in the community service activity in Duwet Village, Tumpang Sub-district, Malang Regency, showed that the partners had not used a blender and freezer specifically for the ice cream production and storage process. This can affect the taste of ice cream, so a blender and freezer grant are needed for the production process and product storage separately and hygienically. In addition, the ice cream processing process is not yet hygienic. Therefore, in this service, equipment grants are given as well as briefings on the importance of hygienic production. The progress of the service activities that have been achieved can be seen in Table 1.

Table 1. Progress of Service Activities

No	Condition Before Activity	Condition After Activity
1	Unhygienic production process	Production process is more hygienic with the use of apron and gloves
2	Incomplete production equipment	Production equipment is complete
3	Product is stored in the freezer mixed with other food ingredients	Product produced is stored in a special freezer
4	The product changes its flavor because it is mixed with the aroma of other food ingredients	Product produced does not change its flavor

3.2. Activity Implementation

The series of Community Service Activities carried out are as follows:

- a. Socialization of the Community Service Program

The community service team from the Department of Business Administration, State Polytechnic of Malang, held a socialization to residents of Duwet Village, Tumpang Subdistrict, Malang Regency, to provide an understanding of the objectives and benefits of the community service program.

- b. Business Location Review

A field review was conducted to evaluate the suitability of the vegetable ice cream production location.

- c. Review of Counseling Location

The counseling location in the ETU Pantry, Building AX and Building AB, Malang State Polytechnic, is prepared for technical training activities on the use of production equipment and equipment handover.

- d. Identification of Equipment Needs

The service team identified the equipment needed by partners, such as blenders and freezers, according to the scale of production and technical specifications needed for the production of vegetable-based ice cream.

e. Preparation of Extension Activities

Counseling is designed to provide technical training related to equipment operation and maintenance, with the aim of extending the life of the equipment and increasing production efficiency.

f. Equipment Procurement

Blenders and freezers that had been identified as the main needs of the partners were then purchased and prepared to be handed over to the partners. Procurement was done based on specifications according to small to medium scale production.

Figures 1 and 2 show the blenders and freezers that have been purchased by the Community Service Team to support the improvement of the quality of ice cream production in Duwet Village.



Figure 1. The Purchased Blender



Figure 2. Freezer for Freezing Ice Cream

g. Equipment assistance and handover:

The service team provides assistance in the use of equipment to service partners. This assistance aims to ensure that partners can operate the equipment optimally and understand the necessary maintenance aspects. At the end of the mentoring, an official handover of the equipment was carried out to the service partners.



Figure 3. Training on The Use of Tools



Figure 4. Activity Briefing on Equipment Use and Equipment Maintenance



Figure 5. Equipment Handover Activity

3.3. Evaluation Results Before and After Procurement of Blenders and Freezers

The results of observations at the service location show a significant improvement in the ice cream production process before and after the procurement of supporting equipment such as blenders and freezers, as listed in Table 2 and Table 3. In addition, the two tables also illustrate the benefits felt by the community before and after the procurement of the equipment.

Table 2. Ice Cream Production Process Evaluation Results (Before)

Tools	Activities	Results
Blender	Pureeing vegetables for ice cream ingredients	Blended vegetables are still mixed with the aroma and flavor of other ingredients
Freezer	Storing ice cream that has been produced	1. The aroma of ice cream is mixed with the aroma of other food ingredients in the freezer
		2. Limited storage capacity, resulting in low production quantities

Table 3. Ice Cream Production Process Evaluation Results (After)

Tools	Activities	Results
Blender	Pureeing vegetables for ice cream ingredients	Blended vegetables are not mixed with the aroma and flavor of other ingredients
Freezer	Storing ice cream that has been produced Activities	Ice cream aroma does not mix with other ingredients in the freezer Increased storage capacity, resulting in more ice cream produced

Based on the evaluation, the procurement of blenders and freezers had a positive impact on the quantity and quality of ice cream produced by the partners, residents of Duwet Village, Tumpang District, Malang Regency. The special blender used exclusively for ice cream production eliminates the risk of mixing aromas and flavors from other ingredients, so that the taste of the ice cream produced is better maintained. Meanwhile, the use of a new freezer with a larger capacity not only allows for the storage of ice cream in larger quantities, but also safeguards the product from odor contamination from other food ingredients, ensuring that the ice cream remains high quality during storage.

Diversifying processed vegetables in the form of ice cream is one of the innovations aimed at increasing vegetable consumption in a more attractive way. The Duwet Village community uses mustard greens and tomatoes as the main ingredients in the production of vegetable ice cream. This ice cream is the result of a combination of freezing and agitation processes, as described by Fadmawati et al (2019). The basic ingredients of ice cream generally consist of milk, emulsifiers, stabilizers, sweeteners, and flavors. Ice cream is also known as a light dessert and is favored by various groups, from children to adults, because of its sweet, savory, cold, and soft taste sensation.

This innovation of using vegetables in making ice cream replaces the role of milk as the base ingredient. For example, mustard greens are rich in vitamins A, C, *thiamin* (B1), *riboflavin* (B2), iron, *phosphorus*, calcium and sodium, providing significant health benefits. The high β -carotene content in mustard greens can help prevent myopic disease (*xerophthalmia*) and serves as an antioxidant that prevents prostate cancer through the *phytochemical* compound *glucosinate* (Fadmawati et al., 2019).

Tomatoes, as another ingredient in vegetable ice cream, also have high nutritional values, including vitamin C, vitamin A, iron, and calcium, which are beneficial in maintaining a healthy body and helping weight loss programs (Ernawati et al., 2016). Overall, food diversification through vegetable-based ice cream innovation provides a healthy alternative for the community, while maintaining the flavors that are popular with many people (Antong & Maharani, 2017b). This equipment procurement and mentoring activity showed significant

results in improving the quality of production, while supporting a healthy lifestyle by consuming vegetables in a more attractive and acceptable form for the wider community.

The importance of nutritious food consumption is increasingly realized by the community, which not only focuses on meeting hunger needs, but also pays attention to the quality of nutrition consumed (Saputri et al., 2016). The application of the principles of diversification of processed foods like this can be one of the steps to increase public awareness and interest in a healthy lifestyle by consuming vegetables in a more varied and attractive processed form. This innovation of using vegetables in making ice cream replaces the role of milk as the base ingredient. For example, mustard greens are rich in vitamins A, C, *thiamin* (B1), *riboflavin* (B2), iron, *phosphorus*, calcium and sodium, providing significant health benefits. The high β -carotene content in mustard greens can help prevent myopic disease (*xerophthalmia*) and serves as an antioxidant that prevents prostate cancer through the phytochemical compound *glucosinate* (Fadmawati et al., 2019).

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4. Conclusion

Based on the results presented in the previous chapter, several conclusions can be drawn. First, the limited knowledge of partners about product quality causes the products produced are not hygienically guaranteed. Second, the supporting equipment used is still the result of sharing with private property, but with the help of supporting equipment, there is an increase in the quality of vegetable ice cream production. Third, the service activities carried out have been able to have a considerable impact in improving the quality of partner production.

In an effort to maintain the plant-based ice cream products produced by partners, the following are some recommended things. Training on product quality is needed so that vegetable ice cream producers can be more creative and innovative. Thus, there will be product sustainability. The lack of knowledge of vegetable ice cream producer partners about marketing so that incentive assistance is needed. Assistance is needed in obtaining government-issued certifications such as P-IRT licenses and food safety certifications to ensure the quality and quality of the vegetable ice cream produced.

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