

Entrepreneurship Training and Assistance in Processing Healthy Vegetable Chips for Residents of Duwet Village, Kec. Tumpang, Kab. Malang

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Abstract

One of the main sources of income in Duwet Village, Tumpang District, Malang Regency is the agricultural sector. Agricultural products that are processed properly will be one of the strategies that can be done to increase the selling value of the product. One of them is by making vegetables as chips. The main focus of this service is making chips made from vegetables. With the training provided, it is intended that the community can make their own various preparations from vegetables that can be served as snacks for the family. In addition, it can also be used to open business opportunities to increase income by utilizing ingredients available in nature. The implementation of the service was carried out in the form of a presentation, followed by a direct demonstration of the process of making vegetable chips. Evaluation of activities is carried out by collecting and summarizing data obtained through filling out questionnaires given to training participants. In this service activity, 4 experiments were carried out so that the results of crispy chips were obtained and did not change the taste of the vegetables used as chips. In addition, training and assistance in the process of making vegetable chips was also carried out by the service team. Based on the results in the field, it was found that the process of making chips was quite easy. Further training is needed for packaging and marketing so that the products produced can be better known to the public.

Keywords: Vegetable Chips, Agricultural Products, Business Opportunities.

1. Introduction

Duwet Village is one of the partner villages that collaborates with Malang State Polytechnic in implementing the Tridharma of Higher Education, namely education, research, and community service. This village was chosen as the location for research and community service activities because of its potential and special characteristics that are in accordance with the program. Memorandum of Understanding No: 470/372/35.07.16.2013/2020, between the Head of Duwet Village and the Deputy Director for Cooperation of Malang State Polytechnic, marks the formality of this relationship.

Duwet Village is located at the western foot of Mount Bromo, Semeru, and Tengger, with an area of 799.216 hectares. Geographically, the village is at an altitude of 700-1500 meters above sea level with coordinates of 8°00'27.92"-8°01'23.53" LS and 112°45'57.40"-112°46'27.13" EAST. Rainfall in the village ranges from 1103 to 2216 mm per year (Badan Pusat Statistik, 2023). The boundaries of Duwet Village include Benjor Village to the north, Dwet Krajang Village to the south, Tursbesar Village to the west, and the buffer zone of Bromo-Tengger-Semeru National Park to the east (Badan Pusat Statistik, 2023).. The village is divided



into two hamlets, Kedampul and Petungsewu, with the majority of the population earning their livelihood as farmers (80.96%).

The village has great potential in the agricultural sector, especially in the production of coffee, fruits (apple, durian, avocado, longan, banana), and vegetables (mustard greens, kale, potatoes, cabbage, tomatoes, carrots). However, the village is still classified as poor, with a poverty rate of 42.26%. The processing of agricultural products in this village is mostly traditional, and the products produced are often damaged due to the lack of adequate processing and preservation techniques.

In an effort to increase the added value of agricultural products, the Malang State Polytechnic service team planned training in making vegetable chips using a Dehydrator. Several types of vegetables such as cabbage, eggplant, pokcoy, and tomatoes will be processed into chips, which are expected to increase farmers' income. Vegetable chips have high nutritional value and can be well received by the community as a healthy snack.

From the results of the situation analysis, several main problems were found in this village:

- a. Lack of innovation and motivation in processing vegetable crops.
- b. The inability of the community to increase the selling value of the product.
- c. The existence of social problems, such as the high level of productive unemployment.

Through this activity, it is hoped that vegetable processing innovation can be a solution to these problems, and improve the welfare of the Duwet Village community.

2. Methods

In this community service (PkM) activity, the following methods were used:

- a. Knowledge Transfer

This activity is carried out with the aim of sharing knowledge with the community about good and standardized chips, how to process chips, how to handle raw materials before processing and the nutritional content and benefits of vegetables that will be processed into chips.

- b. Training

At this stage, participants are given training on how to make vegetable chips and are accompanied directly. Starting from how to handle materials, processing to packaging. In addition, they were also trained on the use of the equipment donated and its maintenance.

- c. Equipment grants to support the production of vegetable chips

The PkM implementer provides equipment grants to support the production of vegetable chips in the form of baking sheets, airtight jars, drainer, gloves and apron.

- d. Discussion and Q&A

Implemented to provide space for the target audience to understand more about the guidance and training delivered and help build a closer relationship between the PkM implementer and the target audience.

- e. Problem Discussion

In this activity, the PkM implementer was directly involved in helping the community of Duwet Village, Tumpang Subdistrict, Malang Regency by donating equipment to support the production of vegetable chips. In addition, with the technique of delivering hygienic vegetable chip production material, keeping the situation formal, choosing language that is firm, straightforward but polite, especially how to influence the community but not seem patronizing.

The evaluation design used in this activity is:

a. Evaluation before the PkM activity

Analyzing the situation by making the community of Duwet Village, Tumpang Subdistrict, Malang Regency the target of interviews/question and answer discussions. This activity was guided by an interview guide to facilitate data and information collection. The content of the interview guide was about the knowledge of vegetable chips and the difficulties and obstacles faced after the vegetable harvesting process. Then try to help provide solutions. The benchmark for this stage was to assess the ability of the community in Duwet Village, Tumpang Sub-district, Malang Regency to produce hygienic vegetable chips.

b. Evaluation during PkM activities

Evaluation at this stage includes the following:

- 1) Evaluation of the absorption of the material that has been given.
- 2) Evaluation of the perceptions formed from the target audience so as to form a positive or negative opinion of the proposed PkM implementer.
- 3) Evaluation of the attitude of accepting and supporting the proposed material presented, so as to form the ability and willingness of the people of Duwet Village, Tumpang District, Malang Regency to implement the proposed material that has been submitted.

The benchmark of this stage is to ask for answers from the target audience on the questionnaire that has been prepared, where from the answers it can be concluded about the perceptions and attitudes of the target audience, namely supporting or rejecting the proposal of the PkM implementer.

c. Final evaluation of PkM activities

From the overall results of PkM activities, analyze the things or proposals of PkM implementers that are approved and rejected. Look for the background, reasons, and factors that support the perceptions and attitudes formed from the target audience. From the data and information collected, it can be concluded whether PkM activities contribute and benefit and are in accordance with the institution where PkM activities are carried out.

3. Results and Discussion

3.1. Training Activities for Making Healthy Vegetable Chips

The training activities were carried out on August 23, 2024 at the ETU Kitchen, 3rd Floor AX Building, Malang State Polytechnic. This activity was attended by 16 residents of Duwet Village, Tumpang District, Malang Regency. This activity begins with the process of cleaning the vegetables used. Then proceed with the process of cutting vegetables and then arranging them on the tray. The last process of cutting vegetables is put into the food dehydrator. When the food is processed in the food dehydrator, it is necessary to set the time and temperature of the tool. The photos of the activities are as follows:



Figure 1. Training and Mentoring Activities



Figure 2. Training and Mentoring Participants



Figure 3. Enthusiasm of Training and Mentoring Participants

3.2. Evaluation Results Before and After Training and Assistance in Making Healthy Vegetable Chips

The results of observations at the service location show a significant increase in community knowledge about the production process of healthy chips, both before and after the implementation of training and mentoring. This improvement is reflected in Table 1 and Table 2, which provide an overview of the changes in knowledge as well as the benefits felt by the community after the activity. Before the training, participants used methods that were less than optimal in terms of health and efficiency, while after the training, they adopted new methods that were healthier and more efficient.

Table 1. Evaluation Results of Training and Assistance on Healthy Vegetable Chips Production Process (Before)

Activity	Results
Making Healthy Vegetable Chips	Prior to the training, participants produced vegetable chips by deep-frying, which causes the chips to become oily and reduces the nutritional quality. This process also requires a large amount of oil, and the resulting waste cooking oil (used cooking oil) is quite large. This method not only has a negative impact on the health of the product but also on the environment, due to excessive oil waste.

Table 2. Evaluation Results of Training and Assistance for Healthy Vegetable Chips Production Process (After)

Activity	Result
Making Healthy Vegetable Chips	After the training, participants gained new knowledge about making chips using a food dehydrator, a device that dries vegetables without the need for oil. The chips produced are not oily, so the nutritional composition does not decrease and the quality is maintained. This method is also more environmentally friendly as it does not produce leftover cooking oil, thus reducing the negative impact of food processing waste.

By processing vegetables into vegetable chips, it will provide added value. Added value is an increase in the economic value of a product produced through various processes, including processing, transportation, and storage in the production chain (Chotimah et al., 2019). According to Rukka et al., (2018), the food and beverage industry has promising prospects given the high public demand for various types of food products. One of the food industry sectors with great potential is the chips industry. Chips are snacks that are usually processed in the form of thin slices with a crunchy texture and savory taste, made from ingredients such as tubers, fruits, or vegetables, using certain processing techniques.

Chips that are marketed in general have a variety of flavors, such as salty, spicy, and sweet, and are often consumed as snacks without causing a feeling of fullness. However, vegetable chips have the added advantage of being able to be consumed as a complement to staple foods, such as rice, given their good nutritional content, especially in the form of vitamins and minerals that are beneficial to health. Currently, various innovations have been made to increase the added value of the community's economy through the utilization of vegetables as the basic ingredients for making chips.

Lestari et al. (2015) in their research reported that out of 30 panelists, 57.3% liked kale chips with lung flavor formulated using 100% rice flour. This study shows that vegetable chips can be accepted by consumers in terms of taste. In addition, Tsalitsa (2019) also conducted a business plan for processing carrot chips called "Healthy Kriptel". From the financial analysis,

this business is considered feasible with a Net Present Value (NPV) value of IDR 678,230,947, which means that the business development is feasible to continue because the NPV value ≥ 0 and is positive. The Internal Rate of Return (IRR) value obtained of 141.78% also shows a significant level of profit.

Vegetable chips are a product that can be accepted by the community both in terms of taste and nutritional benefits. In addition, the development of the vegetable chips industry not only offers opportunities to improve consumer health through more nutritious snack products, but also has great potential to support community economic improvement through product innovation and sustainable processing.

The changes achieved through this training and mentoring are significant. The initial frying-based production method not only reduced nutritional quality but also created environmental problems due to waste oil. Meanwhile, the food dehydrator method introduced in the training provides a solution to produce healthier and environmentally friendly products. The use of this tool keeps the nutritional composition of vegetables intact as it is not exposed to high temperatures and does not require oil. The result is a final product that is not only healthier but also more sustainable.

3.3. Results of SWOT Analysis (Strengths, Weaknesses, Opportunities, Threats) After Training and Mentoring on Making Healthy Vegetable Chips

SWOT analysis is a framework used to identify strengths, weaknesses, opportunities, and threats in a program or activity. The following is a SWOT analysis for the training and mentoring program in the production process of healthy vegetable chips.

Table 3. SWOT Analysis of Training and Mentoring for Healthy Vegetable Chips Production

Aspects	Analysis
Strengths	The use of a food dehydrator produces healthier chips, without oil.
	The drying process maintains the nutritional value of vegetables, resulting in higher quality products.
	Reduces the use of oil, which has a positive impact on the environment because it does not produce waste cooking oil.
	Improved community skills in producing healthy food.
Weaknesses	Food dehydrator requires a high initial investment to purchase the equipment.
	Limitations in the use of electrical energy, especially in areas with limited or unstable access to electricity.
	Lack of initial public knowledge about food drying technology.
	Increased market demand for healthy and oil-free food products.
Opportunities	Support from the government or related institutions for innovative programs in healthy food production.
	Potential to expand the healthy vegetable chips production business to a wider market, including e-commerce.
	Increased public awareness about the importance of a healthy diet, which can be a driver of business growth.
	Competition with cheaper conventional chips products on the market.
Threats	Dependence on stable electricity supply, which can be a problem in certain areas.
	Risk of damage to equipment (food dehydrator) which requires expensive maintenance or replacement of equipment.
	Lack of market interest if the price of healthy chips is higher than regular fried chips.

Based on Table 3, the following explanation can be given:

a. Strengths:

The use of food dehydrator as a technology in the production of healthy chips is a major advantage. This process maintains the nutritional quality of the product and does not require oil, making it healthier and more environmentally friendly. In addition, the new skills acquired by the community have the potential to improve the local economy and open new business opportunities.

b. Weaknesses:

While food dehydrator technology offers many benefits, it is relatively expensive and requires access to stable electricity. This is an obstacle especially in areas with inadequate electricity infrastructure. In addition, it may take time for people to fully master the use of the device.

c. Opportunities:

There are many opportunities to capitalize on the growing trend of healthy lifestyles. Healthier food products, such as oil-free chips, have great market potential. In addition, support from the government and related institutions in community empowerment and food innovation programs can be leveraged to expand the scale of the business.

d. Threats:

Although healthy chip products have many advantages, there are some threats such as price competition with cheaper conventional chip products and the risk of electricity instability. In addition, if these healthy products are sold at a higher price, there is a risk that consumers will prefer conventional chips.

This SWOT analysis helps provide an overview of the position of the healthy chips production training program and its potential to grow or face challenges in the future.

4. Conclusion

Based on the results as presented in the previous chapter, the following conclusions can be drawn. The implementation of Entrepreneurship Training and Assistance in Processing Healthy Vegetable Chips for residents of Duwet Village, Tumpang District, Malang Regency, showed significant results in empowering the community. The program succeeded in increasing the knowledge and skills of the community in processing vegetables into healthy food products with economic value. The use of food dehydrator technology allows the community to produce healthier chips without oil, while maintaining the nutritional quality of the vegetable base. In addition to providing technical insights, this training also has the potential to improve the local economy through vegetable chip processing businesses.

Based on the evaluation results before and after the training, it was evident that the traditional frying method used previously not only decreased the nutritional value but also had the potential to pollute the environment. In contrast, the drying method using a food dehydrator produces a healthier and more environmentally friendly product, and is more stable in terms of quality.

Based on the service that has been carried out, in ensuring the sustainability of the healthy vegetable chips business, it is recommended that the community continue to develop product variations by utilizing various types of local vegetables. The development of flavor and packaging innovations is also needed to increase product competitiveness in a wider market. Moreover, in expanding market reach, communities are encouraged to utilize digital and e-commerce platforms. Thus, healthy vegetable chips products can reach a wider range of

consumers, including markets outside the region that have a high awareness of healthy lifestyles.

A stronger synergy between the community and the government and related institutions is expected in terms of empowerment, advanced training, and access to entrepreneurial development programs. This will increase the sustainability and economic growth potential of the community through the healthy vegetable chips business.

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