



Empowerment of PKK Wanagiri Group through the Application of Natural Preservative Aloe-coating on Strawberries

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A B S T R A C T

Postharvest handling of strawberries is an effort to prevent damage, maintain quality and extend shelf life. The application of the edible coating is a step that can be taken in the postharvest handling of strawberries. The number of harmful preservatives on the market is a cause for concern. Aloe vera gel is a natural ingredient that can be used as an edible coating for strawberries. Empowerment of community groups in the application of natural preservative Aloe-coating on strawberries can overcome the problems that exist in the community. One of the groups in the villages that has this problem is the Empowering Family Welfare Group *PKK Wanagiri*, which is located in Sukasada District, Buleleng Regency, Bali Province, Indonesia. Partners do not know post-harvest handling, entrepreneurship, and marketing. The solutions to solve the problems are: providing knowledge about post-harvest handling, packaging, entrepreneurship, and marketing. Appropriate technology on how to make Aloe-coating and methods of its application to strawberries are provided and quality can be maintained. The method used is active community participation and exploratory. The result is community service activities have been running smoothly. The *PKK Wanagiri*, get the added value and their standard of living has increased. Post-harvest handling of strawberries can be applied. Knowledge of Aloe-coating produce, method of application, packaging, hygiene sanitation, entrepreneurship, and appropriate product marketing was understood and applied. This activity is carried out continuously and the group can independently make aloe vera coating, and apply it to strawberries, thereby increasing income.

1. INTRODUCTION

1.1. Research Background

Empowerment of rural communities to improve the quality of life and the welfare of the village community as much as possible [1]. In addition, it is an effort to develop independence and the welfare of the community by increasing knowledge, attitudes, and skills, and utilizing resources through assistance from the priorities of community problems [2]. Wanagiri Village is a village located in Sukasada District, Buleleng Regency. Most of the people's livelihoods as farmers. The total population is 3111 people, 1620 male, and 1491 female. Wanagiri Village has various natural potentials that need to be developed, one of which is strawberries [1].

Women currently have a very important role, because they are considered to be a productive age [3] [4]. The Indonesian government has made efforts to empower women by involving various parties such as the Ministry of Women, women's

institutions, and universities to facilitate training and financing of women's development activities. One of the women's groups in Wanagiri village is a family welfare empowerment group known as PKK. The location of Wanagiri village and this group is far from the crowds and is still lagging in various skills and requires support, empowerment, and assistance to foster an entrepreneurial spirit. Mentoring activities will support members to understand postharvest handling of strawberries with the application of Aloe-coating.

The problem with strawberry production in Wanagiri village is that the quality quickly declines and the shelf life is short [5][6]. With the application of Aloe-coating, it is hoped that post-harvest shrinkage can be suppressed, quality is maintained, the shelf life is longer so that marketing can be wider and people's incomes will increase [7]. The use of Aloe-coating as a preservative in strawberries can support the purpose of community service in universities, namely providing solutions based on situation analysis according to needs, challenges, or problems that exist in society [8]. In the post-harvest handling process, the type, and quality of the raw material for strawberries greatly influences the

success of the application/coating process [9]. Therefore, it is necessary to develop postharvest handling with some improvement efforts with the application of Aloe-coating to maintain the quality and extend the shelf life of strawberries [6][10]. Aspects of product quality and shelf life need to be studied for business development, and product marketing development [11].

The PKK group in Wanagiri Village, chaired by Mrs. Komang Budiantini, was formed in 2000 with a total of 20 members. The group activity only helps to pack strawberries in regular packaging without any efforts to maintain quality and extend shelf life. This group did not yet know good postharvest handling, nor did they know about entrepreneurship and marketing. Strawberries that have been produced are usually not only marketed to markets around the village but are also taken by middlemen at relatively low prices. With community service activities funded by the Ministry of Education and Culture Research and Technology of the Republic of Indonesia, the PKK Wanagiri group hopes to have skills and insight in managing natural resources and maintaining local wisdom, and having an entrepreneurial spirit, to be able to open wider business and marketing opportunities [2][12].

1.2. Literature Review

1.2.1. Strawberry Fruit Postharvest

Strawberry postharvest aims to maintain the freshness of the fruit so that it will extend its shelf life. Post-harvest activities start from harvesting, fruit collection, sorting, grading, and packaging. Efforts made to prevent post-harvest damage while maintaining shelf life due to respiration and transpiration rates include the use of low temperatures (cooling), modification of the storage room atmosphere, exogenous application of chemicals, wax coating, and edible coating. The coating on strawberries should not use harmful coatings because strawberries are a fruit that can be eaten directly from all parts of the fruit. Strawberry fruit is a fruit that is susceptible to quality degradation, so it must pay attention to various aspects of post-harvest handling. One way to extend the shelf life and maintain the freshness of strawberries is by coating the surface of the fruit with Aloe-coating. Coatings of appropriate thickness and thickness can prevent the aerobic condition of the fruit and provide the necessary protection against cuts/scratches on the fruit surface. Thus, the quality can be maintained and the shelf life is longer.

1.2.2. Coating Application

The lack of application of postharvest handling technology makes abundant strawberry production a problem at harvest time [13][14]. Some farmers used to pick strawberries to sell to cafe entrepreneurs in the local area so that post-harvest handling technology was minimal. To be able to further increase the selling value, increase market reach, and minimize yield loss and waste, the application of post-harvest handling technology should be further improved [15][16]. Strategies that can be taken so that the freshness of the strawberries is maintained. after the fruit is picked, it is handled immediately and does not experience delays. The first step is to dye it with Aloe-coating to control the fungus or with aloe vera gel combined with anti-microbial additives [17][18]. Furthermore, the proper packaging and storage process is under the purpose of whether it is directly sold or transported. The right storage for

strawberries is at a temperature of less than 10°C, according to research results the optimal storage temperature is 4°C [19][20].

1.3. Research Objective

The objectives of this community service activity include: 1) The community of Wanagiri Village, especially members of the PKK Wanagiri Group, get the added value and their standard of living has increased. 2) Post-harvest handling of strawberries could be better to maintain quality and extend shelf life. 3) Knowledge of Aloe-coating manufacture, method of application, packaging, and hygiene sanitation were learned which can help extend the shelf life of strawberries. 4) Entrepreneurship and appropriate product marketing techniques are expected to be understood by partners.

2. MATERIALS AND METHODS

2.1. Materials and Equipment

PKK Wanagiri will be given a set of knowledge regarding post-harvest handling insights, knowledge about edible coatings made from aloe vera gel or Aloe-coating, methods of application of Aloe-coating on strawberries, including packaging methods, product storage so that the shelf life is longer. Partners are also given knowledge about entrepreneurship and product marketing. The knowledge package provided is expected to improve the skills and competencies of group members in the postharvest handling of strawberries.

To support the training process for post-harvest handling of strawberries with the application of Aloe-coating, the following infrastructure is needed: 1) A leaflet containing instructions for post-harvest handling of strawberries, the manufacture of Aloe-coating, and methods for its application to the surface of the fruit. 2) Schedule of activities and time required. 3) Strawberry postharvest handling equipment and Aloe-coating manufacture. 4) Consumables are materials used to make Aloe-coating and strawberry fruit packaging,

2.2. Implementation

The implementation method is a pattern or system of actions to be carried out or the sequence and stages that are necessary for carrying out community service activities. The implementation methods to be implemented include coaching, training, mentoring, and structured consultation on various things that become obstacles to providing added value for partners. The achievement of the implementation objectives is determined by the implementation process. One way to achieve this goal is to use the right method. The method concerning the achievement of implementation goals so that it can be included in long-term memory is also an aspect that can facilitate the implementation path towards what has been formulated.

The Community Service *PKM program* is carried out using training through lecture and discussion methods, demonstrations and training, as well as questions and answers. a) Lecture and Discussion Method: This PKM activity will be started by giving lectures and counseling to housewives of PKK members in Wanagiri Village. These women were gathered in a room with the implementation team to give lectures on the material for the activities. The material provided is related to the postharvest handling process of strawberries, making Aloe-coating and its application method, packaging, entrepreneurship, and marketing. This activity aims to provide theoretical knowledge to mothers

about the material for the activities to be carried out. The activity was then continued with a discussion method to deepen the respondents' understanding of postharvest handling products for strawberries and learning media.

In the implementation of the activity, more pictures and explanations are displayed regarding postharvest handling of strawberries, making Aloe-coating and its application methods, packaging, entrepreneurship, and marketing in the hope that respondents can understand more quickly. b) Demonstration and training methods: Demonstration and training activities are follow-up activities carried out by PKM implementers to the lectures and discussions that have been carried out. This activity was carried out by demonstrating the post-harvest handling process of strawberries, making Aloe-coating and its application methods, packaging, entrepreneurship, and marketing.

3. RESULT AND DISCUSSION

3.1. Results

The community service program activity entitled Empowerment of PKK Wanagiri Group through the application of natural preservative Aloe-coating on strawberries at PKK Wanagiri group, Wanagiri Village, Bali, has been running smoothly. The activity was carried out on Friday, May 27, 2022, in the form of counseling or theoretical studies to provide an understanding of appropriate technology materials for the application of natural preservative Aloe-coating on strawberries, providing equipment assistance, providing knowledge about packaging, and labeling products for strawberries, marketing, and entrepreneurship. (Figure 1). The activity then continued with hands-on practice of technical production of Aloe-coating and the application of natural preservative Aloe-coating on strawberries. The participants who attended this activity were 20 people from the PKK Wanagiri Group, Wanagiri Village. The extension team also donated tools and materials for the application of natural preservative Aloe-coating on strawberries. This community service activity has been published in newspapers and electronic media.



Figure 1: Community service participants (A, B), delivery of equipment assistance to the head of Wanagiri Village and the PKK Wanagiri group (C), presentation of service materials (D).



Figure 2. Practice activities for making Aloe-coating and its application to strawberries

3.2. Outcomes

In detail, the outcomes achieved from this community service activity include appropriate technology, mass media publications, videos of activities, and strawberry products.

3.3. Benefit

The group gains skills in developing the application of natural preservative Aloe-coating on strawberries. From the 20 people group, 16 people have mastered the technology of the application of natural preservative Aloe-coating on strawberries and 87,5% can make Aloe-coating and applicate on strawberries.

3.4. Partner's contribution to the implementation

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 the application of the natural preservative Aloe-coating on strawberries.

3.5. Implementation of community service

In the implementation of service activities, the inhibiting factor is the dense condition of traditional and religious events. This condition makes it difficult to find a schedule for the implementation of activities. The supporting factor in this activity was the group's great desire to participate in further training on the development of strawberry products that have a longer shelf life. In addition, due to the effects of the covid-19 pandemic which has made tourism quiet, members can earn additional income by producing fresh strawberries. Obstacles encountered in the implementation of community service can be overcome by communicating with group leaders and village officials. Extension activities and direct practice can take place smoothly which is attended by 20 group members. This activity was carried

out by the Covid-19 prevention health protocol. Furthermore, the service team will continue to assist the development of strawberry products. The strategic step to realizing the next plan is to assist the group in the postharvest handling of strawberries.

4. CONCLUSION

The conclusion that can be drawn from this activity is that community service activities have been running smoothly. The community of Wanagiri Village, especially members of the PKK Wanagiri Group, get the added value and their standard of living has increased. Post-harvest handling of strawberries could be better to maintain quality and extend shelf life can be applied. Knowledge of Aloe-coating manufacture, method of application, packaging, and hygiene sanitation was learned which can help extend the shelf life of strawberries is applied. Entrepreneurship and appropriate product marketing techniques are understood by partners. It is recommended that this activity be carried out continuously and assist the group so that the group can independently make Aloe coating and apply on strawberries and be able to market them.

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