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PROCESSING NIPAH LEAVES INTO DIETARY JELLY CANDY USING FERMENTATION TECHNOLOGY WITH FAMILY WELFARE DEVELOPMENT

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Abstract

This service activity is aimed at optimizing the potential of Lactobacillus plantarum fermented palm leaves to become low-calorie diet jelly candy. This activity took place in Jeruju Besar Village, Kubu Raya, Pontianak, with PKK women. Local communities are expected to become entrepreneurs in order to improve family welfare. The results of the community service program, specifically in the aspect of applying appropriate science and technology for processing food products based on local potential, namely the nipa plant, are seen as very effective in building community independence. In terms of benefits, it is also quite substantial, namely increasing the added value of nipa leaves, raising people's awareness, knowledge, and skills in utilizing and processing nipa leaves into jelly candy.

Keywords: Nipa, Jelly Candy, Diet, Fermentation

INTRODUCTION

Nipah (Nypa fruticans (Thumb) is a plant from the Palmae family and is classified as a mangrove forest plant that grows along brackish water rivers. Traditionally, nipah has been used by the Batu Ampar community in Pontianak to make sugar and salt from its fruit (Subiandono et al., 2011). Ecologically, Nipah plants help prevent seawater abrasion. Nipah plants filter surface water (runoff) from land to rivers. Nipah plants, in addition to having ecological benefits, also have economic benefits, namely as a commodity that is utilized, such as nipah leaf roofs. People use the roofs as roofs for houses, livestock pens, or to make huts in the garden. The leaf stalks make brooms and can be used for weaving and rope. The fronds can also be used as a material for making salt and as firewood (Febriadi & Saeni, 2018). Nipah sap can be made into sugar, fermented into vinegar, and used as a raw material for bioethanol, which can be used as biofuel. Nipah shoots are edible, and young nipah fruit can be used. It is made into a palm fruit (kolang-kaling) for drinks, kolak (comolet), jam, and preserves. Mature

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nipah fruit can be ground to extract its flour (Afrizal & Pato, 2017).

Jelly candy is a soft-textured processed product, usually made from fruit juice and gelling agents, with a transparent appearance, a particular texture and elasticity, with the addition of hydrocolloid components such as agar, gum, pectin, starch, carrageenan, and gelatin (Isnanda, 2016). Research is being conducted on jelly candy made from plant extracts or powders. One such potential plant is the nipah (Nypa fruticans). Nipah grows abundantly in downstream areas of rivers with abundant soil and mud deposits (Subiandono et al., 2011). The mature leaves contain nutrients including 14.23% protein, 2.33% fat, 49.99% extract, 20.5% crude fiber, 12.88% ash, and an IC50 antioxidant activity value of 43.59 µg/mL (Mukti et al., 2020). Nipah leaves contain almost all bioactive compounds with antioxidant properties, namely flavonoids, phenolics, tannins, steroid saponins, and triterpenoids (Gazali & Nufus, 2019). Fermented nipah leaves from Saccharomyces cerevisiae, formulated into low-calorie jelly candy, will have a higher bioactive compound content and antioxidant capacity. During the fermentation process, enzymes are produced that release bioactive compounds such as phenolics bound to insoluble fiber. The more compounds released, the greater the antioxidant activity, potentially acting as lipase inhibitors (Zubaidah et al., 2012).

Research by Attahmid et al. (2020) obtained a consumer-acceptable jicama jelly candy formula with a composition of 50% jicama fruit juice, 3.5 g of a carrageenan-konjac mixture, 15 g of sorbitol, 0.2 g of citric acid, 20 mL of high fructose syrup, and 10% rosella extract. Muawanah et al. (2012) obtained the best kecombrang water extract jelly candy formulation, namely 17.2% sucrose, 29.5% glucose syrup, with 10.5% sweetener and showed antioxidant activity (IC50) of 161.82 µg/mL; hardness of 130.43 g force; elasticity of 10 mm; pH 3.84; water content of 4.92% (w/w); ash content of 0.14% (w/w); protein content of 7.34% (w/w); fat content of 0.15% (w/w); reducing sugar content of 6.18% (w/w); Pb metal of 0.52 mg/L and the total microbial value until the end of storage has met the jelly candy quality standards in SNI 3547.2-2008. The sweetener substitute for sucrose is sorbitol (sugar alcohol), a monosaccharide, a Polyhydric alcohol, and a hexitol. It has a relatively high sweetness level, approximately 50-70% lower than sucrose, and a low calorie content of approximately 2.6 Cal/g (National Standards Agency, 2004).

The world is experiencing health problems, including obesity, as reflected in health indicators, including the Sustainable Development Goals (SDGs). Obesity cases in Southeast Asia, including Indonesia, have doubled among adults, from 17.1% to 33.0% (Oddo et al., 2019). Obesity is a condition of excess body fat resulting from increased pancreatic lipase enzyme activity (Patonah et al., 2017). The high obesity rate in Indonesia and the use of synthetic diet pills, the long-term use of which can cause dangerous side effects, necessitate the need for natural ingredients with potential as diet pills, one of which is the Nipah plant.

This Community Service Program activity aims to utilize the abundant nipah leaves in West Kalimantan, particularly in Kubu Raya Regency, while also improving the skills and competitiveness of the community in processing nipah leaves through fermentation using Lactobacillus casei, which becomes low-calorie jelly candy for a diet.

IMPLEMENTATION METHOD

This Community Service activity was conducted with the Family Welfare Movement women in Jeruju Besar Village, Kubu Raya, West Kalimantan. The activity lasted one day, from 8:00 a.m. to 3:00 p.m. The Community Service implementation strategy consisted of several stages: field orientation and socialization, training, mentoring, evaluation, and monitoring. This activity was held offline and centralized in an open space, namely Equator Park, Jeruju Besar Village.

The field orientation and current conditions determined the target audience's final condition and prepared permits for subsequent activities. Socialization was conducted to provide information about the potential and health benefits of Nipah leaves and how to process Nipah leaves into a higher-value product, namely jelly candy. Subsequent activities were agreed upon between the implementation team and the target audience. Dissemination was provided to the target audience through training, mentoring, evaluation, and monitoring. The training included a demonstration of fermentation-based jelly candy production technology. During the training phase, participants, in this case the target audience, participated in hands-on jelly candy production practices, following the examples demonstrated by the implementation team. Afterward, the implementation team also provided direct mentoring to assess the skills of the target audience. Evaluations were conducted before and after the series of technology dissemination activities, measured using quizzes or direct questions from the implementation team to the target audience regarding the activities to determine their level of empowerment.

RESULTS AND DISCUSSION

The nipah palm (Nypa fruticans) plant is still traditionally used and processed by local communities as a remedy for herpes, toothache, and headaches (Lovly MS and Teresa MV, 2018). In addition to its high fiber, low-fat, and low-calorie content, Nipah leaves also contain bioactive compounds with potential lipase inhibitor properties, including saponins, flavonoids, and tannins (Sahoo et al., 2012). Fermented nipah leaves with Lactobacillus plantarum increase the bioactive compound content and antioxidant capacity. Processing nipah leaves can be a fun and innovative diet therapy through lipase inhibitors without the need for a high-fat diet, with low-calorie jelly candies formulated from fermented nipah leaves that can be consumed daily.

Implementing the Community Service Program involves orientation, implementation, and evaluation. The implementation phase will involve socialization and dissemination, which will involve jelly-making practices. Field orientation is the stage to determine the final condition of the target audience and prepare permits for subsequent activities. The outreach program aimed to provide information on the potential and health benefits of Nipah leaves and how to process them into a valuable product, namely jelly candy. Subsequent activities were agreed upon between the implementation team and the target audience. Dissemination was provided to the target audience through training, mentoring, evaluation, and monitoring. The training included demonstrations of fermentation-based jelly candy production technology. During the training phase, participants, in this case the target audience, participated in hands-on jelly candy production practices, following the demonstrations provided by the implementation team. Subsequently, the implementation team provided direct mentoring to

assess the skills of the target audience. Evaluations were conducted before and after the technology dissemination activities, measured by quizzes or direct questions from the implementation team to the target audience regarding the activities undertaken to determine the level of participant understanding.

The training began with the implementation team preparing to make jelly candy using a recipe developed by Huda et al. (2015), which was also based on laboratory testing of fermentation technology. After obtaining a successful nipah jelly candy recipe, a practical demonstration of making jelly candy from nipah leaf powder fermented with the lactic acid bacteria Lactobacillus casei was conducted with women from the Family Welfare Program in Jeruju Besar Village, Kubu Raya Regency. The practical demonstration of nipah jelly candy making is shown in Figure 1 below:

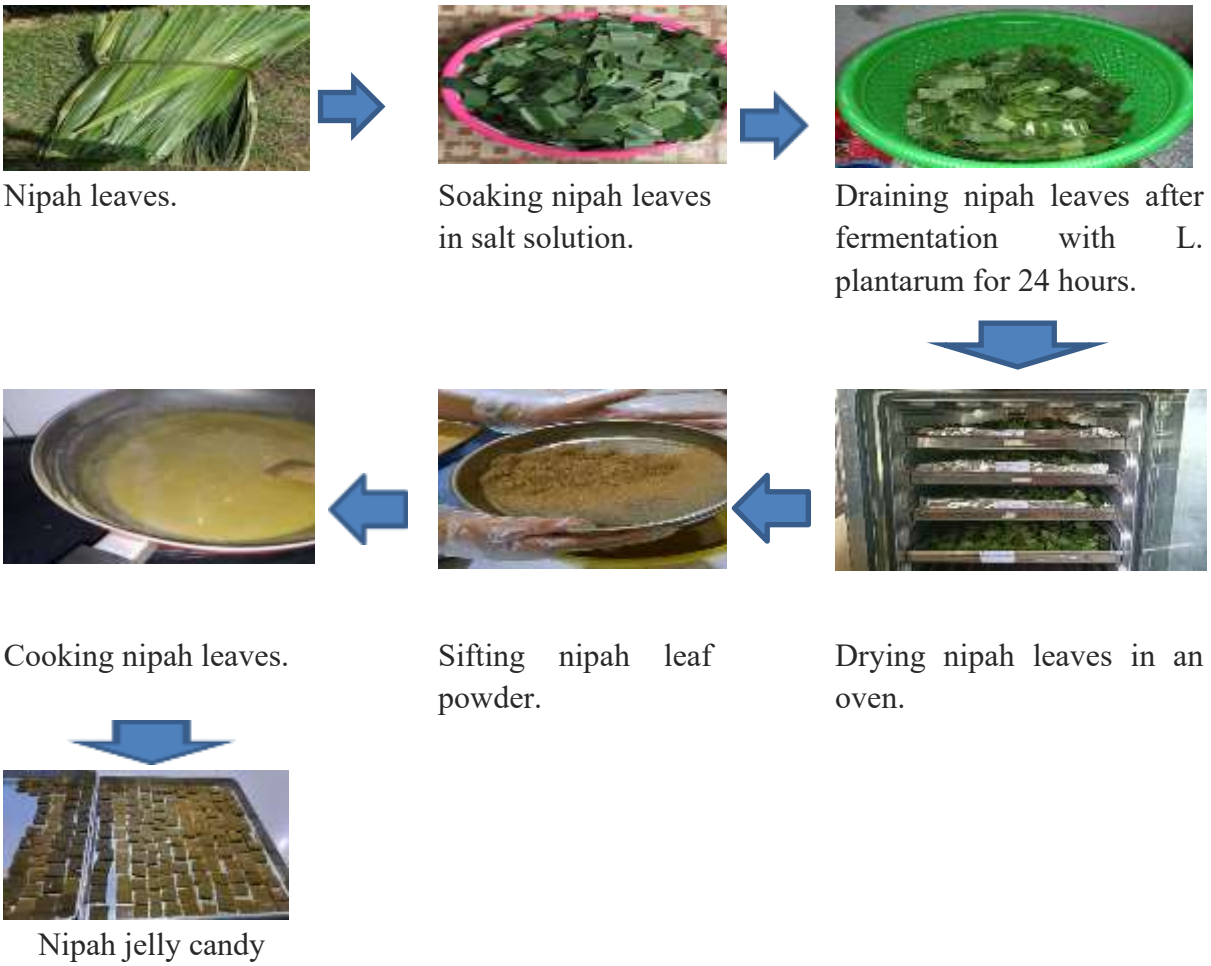

Figure 1. Making Low-Calorie Nipah Jelly Candy

The implementation team also presented ready-to-eat samples of jelly candy made from fermented nipah leaf powder, and the target audience participated in tasting the candy. The implementation team hoped this would foster the entrepreneurial spirit of the women's family members of Jeruju Besar Village, Kubu Raya Regency. Following the implementation team's presentation and the product distribution and tasting, the women enthusiastically asked questions about the ingredients and benefits of the jelly candy made from fermented nipah leaf

powder. The target audience enthusiastically participated in a series of activities organized by the implementation team. At the end of the activity, the implementation team also symbolically handed over several nipah jelly candy production equipment to the target audience in Jeruju Besar Village, who had participated in ensuring the smooth and successful implementation of the activity.

A Google Form questionnaire was developed to assess participant responses and evaluate the training. Sixty percent of participants stated that the training on making nipah leaf jelly candy was very beneficial, and 40% found it helpful. Furthermore, 50% of participants said they would try making the jelly candy themselves. This shows that the PKM activities carried out are based on the needs of women's family members, based on the situation analysis made previously.

CONCLUSION

The community service activities conducted by the women in Jeruju Besar Village, Kubu Raya Regency, Pontianak, showed great enthusiasm in participating. It is hoped that the community will continue this activity, especially the women's family welfare group (PKK) in Jeruju Besar Village, utilizing local wisdom from other parts of the nipah plant to create new business opportunities for the local community.

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