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Improving Corn Processing Skills For Women Corn Farmers In Warbo Village, Arso 7 District, West Arso, Keerom Regency, Papua

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ABSTRACT

Corn is an important commodity in Keerom Regency, especially in Arso District, which is one of Indonesia's corn production centers. Several corn production centers in Indonesia include Jayapura Regency (Nimbokrang), Keerom-Arso Regency, and Jayapura City (West Koya). The problems are 1) corn utilization is limited to consumption or sale in the market to supplement family income; 2) lack of information about corn-based product diversification in Warbo-Arso 7 Village, West Arso District, Keerom Regency due to a lack of technological information and limited community knowledge and skills regarding corn product diversification Based on the above issues, the specific objectives of this community service activity are: 1) to introduce high-value corn-based food products to the people of Kampung Warbo and 2) to train corn-farming mothers and young women to process various types of corn-based food products. The community service method that will be used in this training consists of five stages, namely 1) Preparation; 2) Counseling; 3) Brief practice; 4) Assistance; and 5) Evaluation. The evaluation of activities was conducted before and after implementation, namely through interviews and questionnaires filled out by participants. Based on the results of the post-test on corn processing, 85% of participants were able to understand and absorb the material on corn processing. After the training, 90% of participants were skilled in processing corn flour, corn milk, and corn-based noodles. Then, participants can understand and practice creative and innovative ways of packaging corn products.

Keywords: Corn, milk, noodles, skills, flour

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INTRODUCTION

One agricultural commodity that farmers desperately need for cultivation is corn (Risal et al., 2021). Corn is the second most important food crop in Indonesia after rice. In addition, corn can also be processed into various sources of calories (Mukhlishah, 2022). In addition to being a source of complex carbohydrates, corn contains nutrients that are very beneficial for health, including vitamins B and C, carotene, potassium, iron, magnesium, phosphorus, omega 6, and unsaturated fats that can lower cholesterol (Arma, 2013, Mahdiannoor, 2014 & Saputra, 2015).

Indonesia is a corn-producing country, but it still imports corn. This is because consumption is quite high, both for human consumption and as feed for livestock. Therefore, the government is attempting to implement a corn self-sufficiency policy. This corn self-sufficiency policy is in line with the government's efforts to meet the increasing demand for corn.

Corn is an important commodity in Keerom Regency, especially in the Arso District, which is one of Indonesia's corn production centers. Some of Indonesia's corn production centers include Jayapura Regency (Nimbokrang), Keerom-Arso Regency, and Jayapura City (West Koya). Corn production in the Arso District is abundant, but its utilization and processing are not yet optimal. Currently, the people of Warbo-Arso 7 Village tend to sell their corn harvests to support their livelihoods. The corn sold is often priced very cheaply, with one stack (5-7 ears of corn) selling for Rp. 25,000 - Rp. 30,000. One reason for the low price of corn is that it is sold without processing.

Proper corn-based food processing can be used as a source of family income. Corn-based processed products include corn flour. According to Aljada et al. (2021), corn flour is not only useful as a food thickener but is also good for health. This flour is an important safe source of glucose for individuals with gluten intolerance. In the health sector, corn flour is often used as a source of glucose for individuals with glycogen storage disease (GSD). In addition, the benefits of corn flour or cornstarch can also be enjoyed by people with gluten intolerance (celiac disease). This is because corn flour does not contain gluten, which can cause digestive problems in individuals with celiac disease. Celiac disease is a disease caused by an immune system disorder that causes the body to have an allergic reaction when consuming gluten. Gluten is a type of protein commonly found in grains such as wheat or wheat flour.

Corn can be processed into noodles. Corn noodles were developed to improve food security through diversification of staple foods other than wheat and rice, thereby reducing dependence on rice and wheat. Corn noodles have several advantages, namely their aroma and taste, the natural yellow color of corn, and their suitability for consumption by people with autism (Indrianti et al., 2014). The nutritional content of corn is not inferior to rice or wheat. In fact, corn has advantages as a functional food with high dietary fiber, iron, and beta-carotene (provitamin A) content (Suarni, 2001). In addition, corn is a food with a moderate glycemic index.

In addition to flour and noodles, corn can be processed into corn milk. Corn milk is a type of plant-based milk that is rich in nutrients and suitable for consumption by all segments of society (Setiyono et al., 2020). Processing corn into corn milk has many benefits, including the use of simple equipment (Sutini et al., 2020) and an uncomplicated production method that is easy for farmers to understand (Satiarini, 2006).

Corn milk has many benefits, including being a remedy for children who are allergic to cow's milk It can also be consumed by the elderly because it does not contain cholesterol (Martini et al., 2005). Compared to cow's milk and soy milk, corn milk has the advantage of being easy to obtain and affordable (Larosta, 2020).

The specific objective of this community service activity is to train corn-farming mothers and young women to process corn into flour, milk products, and wet noodles, and to explain creative and innovative packaging models for corn-based processed food products in Warbo Arso 7 Village, West Arso District.

METHOD

The community service method used in this training consists of five stages 1) preparation 2) counseling 3) short practice 4) assistance and 5) evaluation. **Preparation stage**: This stage consists of observation, coordination, and socialization activities with the Head of Warbo Village and a group of corn-farmin women and their teenage daughters regarding the implementation of community service activities. The corn-farming women prepare materials such as corn of various varieties.

Outreach stage: Activities to deliver outreach materials aimed at disseminating information and increasing the knowledge and skills of mothers and young women in Warbo Village. The educational material consisteds of: 1) the benefits and nutritional value of corn; 2) an explanation of corn processing and its economic benefits; 3) an explanation of the tools and materials to be used; and 4) an explanation of product innovations from corn.

Short practice: This activity consists of processing corn into 1) corn flour, 2) corn noodles, and 3) corn milk. During the practice, the corn farmer mothers prepared the venue, prepared the corn ingredients to be processed, and played an active role throughout the activity. **Mentoring stage**: Mentoring activities are conducted during the community service program. Mentoring is provided to corn-farming mothers interested in producing processed corn products with innovative packaging. **Evaluation stage**: Evaluation activities in this community service program are based on the responses of partner groups during community service activities.

RESULTS AND DISCUSSION

Community service activities in Warbo-Arso7 Village were conducted cover two days, motivated by the abundance of corn crops in the village. Corn is the most important food crop in Warbo-Arso7 Village.

A) Outreach Activities

Seventin female corn farmers from Warbo-Arso7 Village attended the outreach activities. The outreach material consisted of three main topics 1) the benefits and nutritional value of corn 2) various corn products and 3) creative and innovative ways of packaging corn products.

Figure 1. Community service activities. (a) Delivery of material; (b) Photos of training participants

Demonstration and Practice Activities

The next step is to demonstrate how to make corn flour, corn milk, and corn noodles. This activity begins with an introduction to the tools and ingredients required. **The tools used include** astove, basin, shallow plate, dry corn sheller, flour sifter, white fine cloth, cake scale, noodle machine, steamer, pot, blender, and knife. **The ingredients used were** sweet corn, dried sweet corn, sugar, salt, clean water, UHT milk, liquid vanilla (optional), corn flour, and cornstarch.

1) Corn flour production

The first demonstration was the preparation of corn flour using sweet corn. The sweet corn was first dried for 7 days, then shelled and washed thoroughly. Next, the corn kernels were soaked for 2-3 hours. If the corn was very dry, it could be soaked for 6-12 hours. The softened corn kernels were placed in a blender, water was added to facilitate blending, and the mixture was blended. The resulting extract was filtered through a flour sieve to remove the pulp. The mixture was filtered a second time using a fine cloth to obtain corn juice. Leave it for 2-3 hours so that two layers will appear, the bottom layer is corn starch, and the top layer is water. The water is immediately discarded, the corn starch is placed on a plate, and it is dried under the hot sun (Figure

Figure 2. Stages of corn flour production. (a) First filtering of corn extract; (b) second filtering results in corn starch; (c) corn pulp; (d) dried corn starch

2. Demonstration of corn milk production

The second demonstration involved making corn milk. The corn used was six ears of fresh sweet corn. Separate the corn kernels from the cob, then weigh 250 grams (9 tablespoons) of fresh corn kernels, put them in a blender, pour 500 ml of water into the blender, then blend the corn kernels until smooth. The result was a corn extract. Next,

the corn extract is filtered using a fine cloth, squeezed, and the corn juice is collected. Cook over medium heat while stirring for several minutes until foam or small bubbles appear in the solution (Figure 3).

FIGURE 3. NEXT DEMONSTRATION OF CORN MILK PRODUCTION. (A) THE PROCESS OF SEPARATING CORN KERNELS FROM THE COB; (B) THE PROCESS OF COOKING CORN JUICE

Next, add 150 grams of sugar, a pinch of salt, vanilla (if you like the aroma of vanilla), then add 1 liter of UHT milk, slowly pour it in, cook over low heat while stirring continuously, please maintain the heat level. Cook until small bubbles appear and it foams, which indicates that the corn milk is ready to be used. The mixture was aallowed to cool, poured into a sterile bottle, and stored in the refrigerator.

Advances in food science and technology have made it possible to process sweet corn into a variety of products that are beneficial to health, including sweet corn milk, pudding, noodles, dodol, and various other products. With these various processing methods, sweet corn is always utilized during harvest surpluses and does not suffer damage due to neglect (agato & narsih, 2011).

3. Demonstration of making corn-based noodles

The third demonstration involved making corn-based noodles. First, weigh the corn flour that had been prepared in the first demonstration, add 10 of salt, and knead until the dough becomes smooth. The dough was shaped into an elongated circle, placed on a white cloth, and steamed for 15 min. Next, the dough is pressed and rolled with a noodle machine, cut into the desired noodle shape, and the corn noodles are ready to be cooked (Figure 4).

The addition of water during the initial mixing process causes the starch particles to swell and lose their structural integrity, as some amylose diffuses out owing to the effect of heat (Jansen, 1993). If too little water is added, the gelatinization process is incomplete, resulting in insufficient gelatinized starch, which cannot bind the noodle dough. However, if excessive water is added, the dough becomes overcooked. Overcooked dough causes the resulting noodle strands to become sticky owing to the large amount of solids diffusing out of the starch (Susilawati, 2007).

Figure 4. Demonstration Of Making Corn Noodles. (A) Participants Listening To An Explanation On How To Use The Noodle Press; (B) Noodle Dough Being Pressed And Rolled With The Noodle Press; (C) The Finished Corn Noodles.

These Findings Are Also Supported By The Study Of Eliasson And Gudmunsson (1996), Which Indicates That High Levels Of Soluble Amylose And High Granule Expansion Capacity Can Increase Elasticity. Conversely, High Levels Of Soluble Amylopectin Interfere With Gel Formation And Reduce Elasticity. This Demonstrates That The Degree Of Gelatinization Is A Critical Factor In Determining The Elongation Properties Of Noodles.

A) Achievements

The corn processing training provided new insights to the women in Warbo Village, Arso 7 District, Keerom Regency, especially in terms of diversifying corn food commodities. The achievement of this training activity is that the participants were able to create packaging and design creative and innovative corn product stickers (Figure 5).

Figure 5. Processed corn products. (a) Corn flour; (b) Corn milk; (c) Corn noodlesTHE

greater the amount of tapioca used, the higher the integrity of the resulting instant noodles. This is because an increase in the amount of tapioca increases the amount of amylose and amylopectin in the ingredients used. In the production of instant noodles made from ingredients other than wheat flour, amylose and amylopectin contribute to the integrity of the noodles. Firmness formation occurs when the granules in the flour or starch undergo gelatinization. This is consistent with the views of (indrianti et al., 2014) , who stated that the firmness of noodles can result from the gelatinization and retrogradation of amylose and amylopectin. Additionally, amylopectin can form a sticky (cohesive) gel when it is suspended in water.

C. Evaluation

In this training activity, evaluations were conducted before and after the activity through interviews and questionnaires filled out by the participants. The questionnaire results are as follows:

Table 1. Percentage Of Participants' Test Results On Corn Processing

Assessment criteria	Composition of participants	
	Before counseling	After counseling
Low	85%	-
Medium	10%	15%
High	5%	85%
Number	100%	100%

Based On The Post-Test Results Of Participants On Corn Processing, 85% Of Participants Were Able To Understand And Absorb The Material On Corn Processing Knowledge (Table 1). Only 15% Of The Participants Had A Moderate Understanding, Which Was Due To Their Lack Of Focus During Training. The Next Evaluation Is To Determine The Usefulness Of Training Activities.

Table 2. Results Of Activity Benefits

Assessment criteria	Composition of participants
Not very useful	0
Useful	10%
Very useful	90%
Number	100%

Based on table 3, 90% of the training participants stated that this community service activity was very useful. Until now, corn has only been used for daily food needs, and they were not aware of other uses for the local corn they grow.

CONCLUSION

After conducting training activities on corn processing in Warbo Village, Arso 7 District, the following conclusions were drawn: 1) Participants were able to understand and comprehend various corn processing methods, so that they became highly skilled in processing corn flour, corn milk, and corn-based noodles, and 2) Participants were able to understand and practice creative and innovative methods of packaging corn products in Kampung Warbo, Arso 7 District, Keerom Regency.

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Ethical Compliance

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