Improving the Capability of Corn Processing into Tortillas by Family Welfare Programme, In Gedong, Ngadirojo, Wonogiri Regency, Central Java, Indonesia

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Abstract. Corn is one of the main agricultural commodities in Wonogiri Regency, Indonesia, especially in the Ngadirojo District. The utilization of corn was not optimal. The community just sold it after harvesting. Community capability, especially Family Welfare Programme, in processing food products is very important and can encourage the food diversification program. Processing corn into tortillas is an alternative effort to increase the added value of agricultural commodities. The aim of this activity was to improve the capability of the Family Welfare Programme member to make tortilla chips. The activities methods were carried out through several stages: (i) the socialization and inventory the potentially of corn; (ii) counseling about corn processing and its benefits; (iii) training and practice of making tortillas; (iv) evaluation of all the activities. The results showed that 100% of partners have corn land but have not utilized it for processing. In addition, 100% of partners have never processed corn into tortillas. The test results showed that there is an increase of partner understanding, in the amount of 20.71%. At the end of the activities, the partners were able to process their own tortilla products. There are four from seven participants who can make tortillas by themselves after the activity.

Keywords: Food diversification, increase community income, women farmer, Zea mays L.

1 Introduction

Gedong Village, Ngadirojo District, Wonogiri Regency, Indonesia has an area of $2.8 \times 10^6 \text{ m}^2$ with an agricultural land area of approximately 100 ha, and the remainder as settlements and roads. Agricultural land in the village of Gedong consists of dry land and rice fields, the center of the village's economy. The crops which is cultivated by the people of Gedong Village include rice (Oryza sativa L.), corn (Zea mays L.), cashew nuts (Anacardium occidentale L.), cassava (Manihot esculenta Crantz), and peanuts (Arachis hypogaea L.). The main commodity planted by the people of Gedong Village is corn covering an area of 46.3 ha; during the corn harvest season, corn production is very abundant. Corn that can be used as a staple food as a substitute for rice is one of the reasons it is widely planted in this village. In addition, corn consumption is also a form of food diversification. Food diversification is not intended to replace rice completely, but to change and improve people's consumption patterns so that more diverse types of food with better nutritional quality. Understanding of food diversification in the wrong way was predicted because of the assumption that rice is the primary food in Indonesia, despite the fact that the population in several regions in Indonesia consumes corn, sago (Metroxylon sagu Rothb.), cassava, and sweet potatoes (Ipomoea batatas (L.) Lam.) as their primary food [1].
The abundance of corn production is not accompanied by the ability of the community to process corn into food products that have added value. During this time, the community has not optimally utilized corn as a variety of processed products that provide added value economically. This is because they do not have yet the knowledge and skills about processing corn. A variety of traditional corn food, both young harvest and dry peeling with their protein, vitamins, minerals, make its prospective ingredient for local food diversification [2]. Some food products that can be made from corn are *maunings*, chips corn/tortillas, corn porridge, and corn flakes. One of the favorite corn processed is corn chips or tortillas [3].

Increasing added value for various corn products is very important to stimulate the microeconomic activities of the community. Community empowerment through increased knowledge and ability in processing various corn products can be the basis for community economic development. Throughout the family, especially mothers are expected to contribute to increasing income for the family. Family Welfare Programme and Women Farmers Group are places for mothers to improve their skills. In Gedong Ngadirojo Wonogiri, The members of the Family Welfare Programme was also a member of the Women Farmer Groups. Women Farmers Group takes an important role as well as a prime mover in the diversification of local food. Women in this matter are on duty as a food processor and provider for their family, therefore the Women Farmers Group are involved in many activities in this local food diversification. Success in local food diversification is reflected in the behavior of KWT members [4]. So, it is necessary to give the training to improve their capability.

## 2 Methods

The problem-solving methodology offered to solve the problem includes the steps in Figure 2.

(i) Counseling about postharvest of corn

The community is given an understanding of the corn’s optimal harvest time to be processed so that the products with the best nutritional content will be produced.

(ii) Counseling about corn processing and product, especially tortilla

Then continued with post-harvest technology counseling about corn products, especially tortillas. The community is given an understanding of the good processing of tortillas, the recipe, and the process. Implementation by lecturing, and discussion (question and answer).

(iii) Practice and training in making tortillas.

After they got the theory of making a tortilla, the activity was continued by practicing making a tortilla. From this activity, it can be seen the improvement of their capability.

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Fig. 1. Problem-solving [5–7].
3 Result and discussion

Post-harvest counseling and processing of corn have been carried out at partner homes, namely Mrs. Marni, Gedong Village, Ngadirojo Wonogiri, Central Java, Indonesia. The activity began with a pretest to find out participants' knowledge about post-harvest and processing of corn, especially tortillas.

The number of participants who attended counseling was seven people. Initial questionnaire results (Table 1) showed that 100 % of the training participants had planted and harvested corn. In addition, raw materials for processed corn products are also easily obtained when the harvest season arrives. As many as 71.43 % of the training participants had never processed corn into food products, 100 % of participants had never processed corn into tortillas, and 100 % of participants had never sold corn products. It means the partners need to improve their capability to process the corn into tortillas. So, it can improve the economic value of corn. The evaluation was done by conducting a pretest (initial test) and posttest (final test) after the counseling activities are carried out. The average initial test results of the participants get a value of 61.43 then the final test results of the average participants get a value of 82.14 so that there is an increase in the knowledge of participants after the implementation of the activity of 20.71 %.

It means that the activity has been successful. The indicators of success in counseling if the value is more than 75.

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you ever planted corn?</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Do you have your own land?</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Have you ever processed corn into processed products?</td>
<td>28.57</td>
<td>71.43</td>
</tr>
<tr>
<td>Have you ever sold processed corn?</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Do you understand tortillas?</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Have you ever made tortillas?</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

The stages of making tortillas are boiling, soaking, washing, seasoning, grinding, molding, drying, and frying in Figure 2.

![Fig. 2. Processing of Tortilla production: a. Soaking and washing; b. Seasoning; c. Grinding; and d. Molding [3, 8]](image)

The product which is made by the participant is not in accordance with the products on the market. This is due to the composition of the different ingredients. An evaluation is carried out to determine the right combination and
composition of the ingredients. The best interaction on the concentration of the lime solution is 4 % and boiling time is 30 min, producing quality corn tortillas with 5.53 % water content, 7.59 % ash content, and carbohydrate content by different 67.96 % [3]. Tortilla chips vary in oil content from 21 % to 34 % (w.b.) depending on corn variety, cooking processes, grinding conditions, baking time, cooling time after baking, and others [9]. During this time, the main raw material on tortillas are tapioca and wheat flour, while the ingredient source of protein used is corn and beans. Tortillas can also be processed from pumpkin [10, 11].

Some changes occurred during processing. Among processed products, there was little difference in the phytochemical contents and antioxidant activities. Among types of corn, the highest concentrations of total phenolics, ferulic acid, and antioxidant activity were observed in the high–carotenoid genotype followed by the regular yellow counterpart. The white corn contained the lowest amount of total phenolics and antioxidant activity. The pigmented blue corn had the highest anthocyanin concentration followed by the red counterpart. These findings suggest that lime–cooking significantly reduced the phytochemical content of nixtamalized products but released phenolics and ferulic acid [12].

4 Conclusion

The results showed that 100 % of partners have corn land but have not utilized it for processing. In addition, 100 % of partners have never processed corn into tortillas. The test results showed that there is an increasing of partner understanding, in the amount of 20.71 %. At the end of the activities, the partners were able to process their own tortilla products.

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