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Mechanization Taro Chips Processing At Small Micro Medium Enterprise In Tambakan Village, Blitar District

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Abstract.

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The community service program to assist the Small Micro Medium Enterprise in Tambakan Village, Blitar Regency East Java, has been done. The program's purpose was to improve the productivity of Taro chips as the prime product of Berkah Mulya Small Micro Medium Enterprise by introducing the appropriate technology to the taro chips making process. Currently, taro chips are produced manually. People did all the steps from cutting, frying, oil separating, and packaging by hand. It was time-consuming. The products sometimes were not uniform in thickness beside the oil content was relatively high, so the product was easy to be rancid. We introduced the cutting machine and the spinner to improve Taro Chips production's quality and quantity in this program. The methods used in this program started with a field survey, observation, socialization, the introduction of the appropriate technology (cutting and spinner machine), workshop and training, and evaluation. By applying the technology, the productivity increased from 5 kg/day become 25 kg/day. The product's quality also becomes uniform in thickness, and the expiration date becomes longer.

Keywords: Mechanization, Talaro chips, Small Micro Medium Enterprise,

I. INTRODUCTION

Blitar district is located in east java, adjacent to Malang and Tulung Agung districts. The area of Blitar district is 1,588.79 km² where 38.02% is plateau or highland. The altitude of the Blitar district is 300-420 meters above sea level[1]. This condition makes the air in Blitar relatively fresh, with the temperature ranging from 18-30°C. The weather is suitable for many plants to grow very well. One vegetation quickly grows in Blitar district is Taro. Taro is easily cultivated in a tropical country with high rainfall, especially in the highland area[2]. Commonly, taro root is consumed as a staple food since it has high carbohydrates. Its stem and leaves are utilized as food, medicine, and wrapper. The leftover taro tuber and taro tuber's skin are used as animal feed[3]. The nutrient of Taro corm contain 70-80 g/100 g of dry Taro), fiber (0.8%), ash (1.2%), (1.5%), and fat (0.2%), and this is similar to many other tuber crops. Taro is also a good source of thiamine, riboflavin, iron, phosphorus, and zinc and an excellent source of vitamin B6, vitamin C, niacin, potassium, copper, and manganese[4]. The Taro plants and taro tuber visualization are shown in figure 1 and figure 2 below.



Fig 2. Taro plants



Fig 1. Taro tuber

Although the Taro tubers are very potential as a staple food, people in Indonesia still prefer to consume rice as a staple food. Some people utilize the taro tubers as a snack called Taro chips. Taro chip's texture is crunchy and delicious. It also has a potato chip-like taste. Taro chips have an excellent opportunity to be developed as a business.



Fig 3. Taro chips

"Berkah Mulya" Small Micro Medium Enterprise (UMKM) produce taro tuber become taro chips. Berkah Mulya Small Micro Medium Enterprise (UMKM) produced taro chips in small capacity because they and just by people's order. They made the taro chips manually without using any machine. They sold the taro chips only to people around the home and put the product in a small store nearby their home. The productivity was still low and became decreased because of the pandemic. Pandemic covid 19 during 2020-2021 significantly impacted Indonesia's Small Micro Medium Enterprise (UMKM). The sector that was much influenced by the pandemic was food and beverage. The Republic of Indonesia's Ministry of Cooperatives and SMEs said that the covid-19 pandemic affected 1.785 cooperatives and Small Micro Medium Enterprise (UMKM)[5]. Through the community service program, the University of Pembangunan Nasional Veteran Jawa Timur (UPN "Veteran" Jatim) helped the Small Micro Medium Enterprise (UMKM) to rise and grow up. The community service program was implemented in Tambakan village, Gandusari sub-district, Blitar district, East Java province. Our partner is a group of local people who run a small business called "Berkah Mulya" Small Micro Medium Enterprise (UMKM). Although UMKM Berkah Mulya produces several products, we focused on Taro Chips in this community service. From the field survey and observation, we identify problems that keep their business stagnant even though they have already run their enterprise for more than five years. The problems are:

- [1] The UMKM Berkah Mulya produces only in a small capacity. It was because they did not have labour that worked for them. They run their small enterprise just with their own small family.
- [2] All production processes were done manually. It was time-consuming because many steps were done to make taro chips, from peeling the taro skin, cutting the taro tube into chips, frying, and packaging.
- [3] The product quality is not uniform in shape and still contains the oil because draining processes after frying has been done manually. It was also time-consuming. It needed several hours to make the oil in the chips drain well.

We find the solution to improve the production process by mechanization from those problems. We provided the chopper machine to cut the Taro into slices and the spinner machine to drain the oil after frying. Those machines are simple but valuable. We believe it will increase their productivity.

II. METHODS

The method of this program consists of four steps. The first step was a field survey to gather accurate information from the partner. Direct observation of the Small Micro Medium Enterprise was done to analyze the actual situation and identify the problem regarding taro chips production. Beside observed the location, we also interviewed the enterpriser and local people. We found that many housewives in Tambakan village produce taro chips on a small scale. Most of them only produce the taro chip on Islamic Holy day (Idul Fitri). From the direct observation to their production place, we found the production area l was not clean enough. All production process was manual using simple devices. The taro chips making process are shown in Figures 4 and 5. Figure 4 shows the taro chopping process using a simple slicer, and figure 5 shows the taro chips frying process.



Fig 4. chopping process



Fig 5. frying process

The second step was finding the solution to the problem. Based on the problems that are identified, the solution we offered were:

- a) Educate the local people about Small Micro Medium Enterprise and legalization.
- b) Improve the people's knowledge about the excellent food production process
- c) Mechanization of the production by providing the chopper machine and spinner machine
- d) Provides the business consulting for them to improve their business.

The last step was to evaluate the effectiveness of the program. The investigation in this program is limited to the appropriate technology for the production process. We compare the quality and the quantity of production before and after the mechanization.

III. RESULT AND DISCUSSION

The socialization process was a crucial step. During socialization, we educate the enterpriser on how to improve their business. Legalization is needed when they want to expand their business. One legal document that they should have is P-IRT (legal document for the home industry). Our previous community service report has published the consulting process regarding the legalization document proposal[6]. Since their product is food, education regarding good food production is needed. The food production standards have been released by the National Agency of Drug and Food Control (BPOM). Indonesian government regulate the Good Manufacturing Practice, “*Cara Produksi Pangan yang Baik Untuk Industri Rumah Tangga (CPPB-IRT)*” related with food safety[7]. The regulation is purposed to protect the consumer from getting inappropriate food. The other solution was applying the simple appropriate technology for taro chip production. There are two machines to be involved, i.e., chopper and slicer machine and spinner machine. The chopper and slicer machine was made at Jaya Steel manufacture Surabaya. It is used to slice the taro tube become slice. Therefore, it can reduce the production time. With the manual process, the slicing process took 1 hour for only 3 kg taro, while the chopper machine can slice 30 kg/hour. Moreover, the thickness of the taro slice can be set depending on the need. The machine power is only 125 watts, suitable for the home industry. The chopper machine visualization is shown in figure 6, while the detail specification is shown in table 1.



Fig 6. spinner machine



Fig 7. chopper machine

One of the most important steps in taro chip manufacturing is frying. The frying process needs a lot of oil, so the chips become crunchy. One problem after frying is the oil draining process. The manual draining process still traps some oil on the chips pore. Our solution to this problem is by introducing the spinner machine. The machine uses centrifugal force to release the oil from the products. The image of the spinner machine and its specification are represented in figure 6 and table 3, respectively.

Table 1. specification of chopper machine

Material	Stainless steel 201
Blade	Standard food grade
Body specs.	30 x 30 mm, thickness 1 mm
Power	125 watt
Voltage	220 Volt
Rotation	280 rpm
Capacity	15-30 kg/hour

Table 2. Specification of spinner machine

Frame Dimension	60 x 25 x 65 cm
Frame Material	Elbow 4x4, stainless steel plate
Transmission machine	Pulley and V belt
Electrical dynamo	60 watts
Outside cylinder	Diameter 28 cm, height 30 cm
filter	Diameter 22 cm, height 25 cm
Capacity	2-3 kg (7 litres)

The spinning result shows that the spinner machine can drain the oil very well. In 3 minutes, run the spinner. About 10 ml of oil can be drained from 2 kg of taro chips. The machine is also very energy-saving and suitable for small home industries or Small Micro Medium enterprises. Usually, they need around 3 hours to drain the oil, so it saves enough to be packed, but now they do not need to wait long to drain the oil. Moreover, with the spinner machine for oil draining, the product quality is better because it is more crunchy and long-lasting. Another concern of our program was the production place. As we noticed in our introduction, the kitchen where they produce the taro chips was not clean enough. So we suggest them to improve the area for production to be clean. Finally, the Berkah Mulya enterpriser changed the floor from cement become ceramic. As shown in figure 8, the production area becomes more clean and the location is not too close with the toilete.



Fig 8. production area after community service program

The last step in our community service program is evaluating and assisting. We assess the improvement of the "Berkah Mulya" Small Micro Medium Enterprise before and after the program. We also helped them with using the machine and how to maintain it. After about seven months of the community service program, there are increasing the productivity of their taro chips. They increase the production from about 10 kg/week become 30 kg/week. The mechanization by using appropriate technology can also increase their productivity and income.

IV. CONCLUSION

Our community service program concludes that:

1. the people's knowledge about the good production process increases. People have become more aware of the safety of food production. The people's skills in operating the machine improve.
2. People can operate very well the chopper and spinner machine.
3. The productivity of Berkah Mulya Small Micro Medium Enterprise increased, and the product quality became better.

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