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Processing Taro Tubers (*Colocasia esculenta* (L) Schott) Become Flour as Efforts to Increase Community Revenues in Mentawai Region

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Abstract: The purpose of this article is to provide additional knowledge to the community about how to manufacture taro flour and introduce the benefits of taro flour as a processed food ingredient. Materials and tools used are taro, salt, knife, pan, water, cutting machine (slicer) and grinding machine (disk mill). The method used is literature study to enrich information in writing and discussion. The results obtained in this literature study activity that soaking tuber taro with salt about 10% after peeling can reduce the itching on taro and flour taro can be used as processed food ingredients such as cake cake so that it can increase people's income.

Keywords: processing, flour, taro, cake, community.

1. INTRODUCTION

One of the local food sources that can be used as an alternative food requirement is taro tuber bulb (*Xanthosoma sagittifolium*) or often called kimpul, an aracea tribe, belonging to the flowering plant "Agiospermae" and a "Monocotylae". In general taro belas (*Xanthosoma sagittifolium*) is a local food source of carbohydrates. In 100 grams of taro contains 145 Kcal of energy, 34.20 grams of carbohydrates, 0.40 grams of fat and 1.20 grams of protein. Djaafar, et.al. [1] suggests that taro can be used as a substitute material of wheat flour. The use of taro flour as a substitute of wheat flour in the processing of various cakes can reach 100%, depending on the product to be produced. Utilization of taro belitung as food today has been done by many people, it's just still relatively simple. As well as in Indonesia taro belitung processed by boiled, fried, dikeripik and usually leaves and stems used as a vegetable, whereas besides that taro can be processed into flour as a raw material in the manufacture of a variety of food preparations and diverse, such as cake, bread, Donuts and others by improving the existing nutritional value.

Flour is a form of processing of materials by grinding or sieve. In the process of grinding the size of the material is minimized by means of crushing the material is pressed with mechanical force of the grinding device [2]. According to Winarno [3] flour is a product that has low water content. Low water content plays an important role in maintaining the durability of a food. The amount of water contained in foodstuffs is influenced by several factors such as the nature and type / origin of the ingredients, the treatment that has been experienced by the food, the humidity of the storage area, and the type of packing. The most common way to reduce water content is by drying, either by drying or with a dryer.

According to Linga [4] the process of making flour can be done in various ways depending on the type of tuber itself. The process of making taro flour begins with the washing and stripping of fresh tubers, which are then sliced. Slicing is intended to speed up the drying process. After that is done soaking with water. Soaking is also a washing process because

it indirectly has a cleaning effect. Drying is then carried out at a temperature of about 50-60 ° C until the water content reaches 12%. Drying is done for 6 hours and usually dried bulb is flipped back and forth to dry evenly. The result of drying is a taro cake which is then ground to produce uniform taro flour.

Research on taro belt flour has been done by Indarasti [5] which makes taro flour as a substitute of wheat flour in making cookies. In the study, carbohydrate content in taro belt was 92.06% (% dry weight), 0.92% fat (% dry weight), 4.88% protein (% dry weight) and energy 359.56 Kcal per 100 gram taro belitung flour. The high content of carbohydrate in taro belitung flour is expected to be able to make taro belt meal into a source of cheap carbohydrate substitute wheat flour, in addition to the low fat content contained in taro belitung flour makes taro belt flour becomes not easily damaged or rancid, so it can be stored in a long time, besides taro belitung flour free from gluten. The absence of gluten on taro belitung flour makes taro belt flour can be used as a diet for people with autism [6]. The purpose of making scientific articles is to provide additional knowledge to the community about how to manufacture taro flour and introduce the benefits of taro flour as a processed food ingredient as substitution of rice substitutes.

II. MATERIALS AND METHODS

The ingredients used in taro flour are taro, sodium chloride, plastic for packaging while the ingredients for making cake are medium protein flour, margarine, egg, sugar, milk powder, cornmeal, and emulsifier and the tools used in taro flour production can be seen in Table 1. below [7].

Table 1. The name of the tool used in the manufacture of taro flour.

Name	of Function Tool
Knives	Taro peel tubes
Slicer cutting machine / slicer	For taro tuber slicer
Basin Container leather	Solution container
Basin Container leather	Solution container
Tray Containers to drain	slices of taro tuber
Water bath	Soak the taro flour slices
Dryer	Drain taro tuber slices
Grinding Machine / disk mill	Grinding dried irisantalas into taro flour
Digital balance	Considering starch ingredients
Sealer	Sealer

III. IMPLEMENTATION METHODS

A. Processing process of taro flour:

Taro flour production is based on the modified Mayasari method [8]. The stages include stripping and slicing of 5 mm tuber using slicer, washing tuber with running water, immersing tubers in water bath 40 ° C for 3 hours, soaking in 10% NaCl (salt) solution for 1 hour Kaffa et.al., [7] washing with water, drying at 60 ° C for 6 hours, as well as grinding and sifting 80 mesh. Flow diagrams of taro flour making can be seen in Figure 1. below.

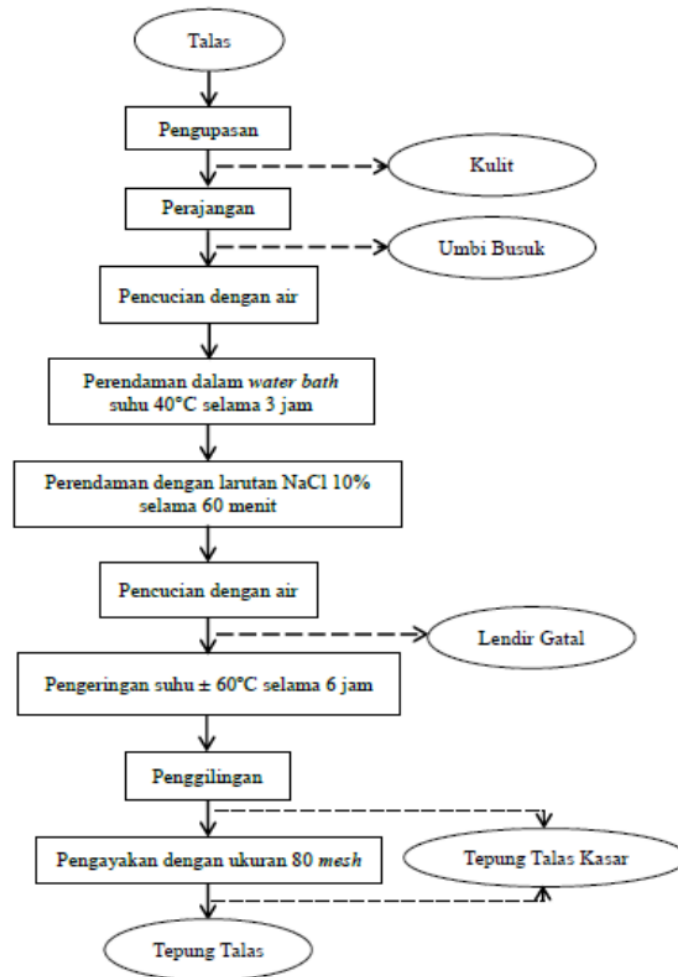


Figure 1. The process of making taro flour [7]

B. Making Taro Flour Cake [7]:

The next activity aims to make the cake of the taro flour produced. Cake made in this experiment is sponge cake type. In making eggs and sugar beaten with a high-speed mixer until it is creamy then add the cake developer and shake it back. After that enter the flour and stir using a rubber spoon with a folding mortar technique. Enter the liquid margarine into the dough and mix again with a rubber spoon. Then the dough is poured into a baking dish and baked in a preheated oven, 180°C for 30 minutes. Cooling is done by allowing the cake that has been removed from the oven at room temperature. After the cold cake taro is ready to cut. The ingredients of cake refer to the results of Kaffa et.al., [7] as shown in Table 2 below

Table 2. Cake Making Material Composition

No	Raw	Composition
1	Medium protein flour (g)	50
2	Taro flour (g)	50
3	Egg (Grain)	4
4	Sugar (g)	90

5	Emulsifier (g)	15
6	Milk Powder (g)	17,5
7	Maizena (g)	12
8	Margarine (g)	100

Next process of making cake like picture 2 below [7]

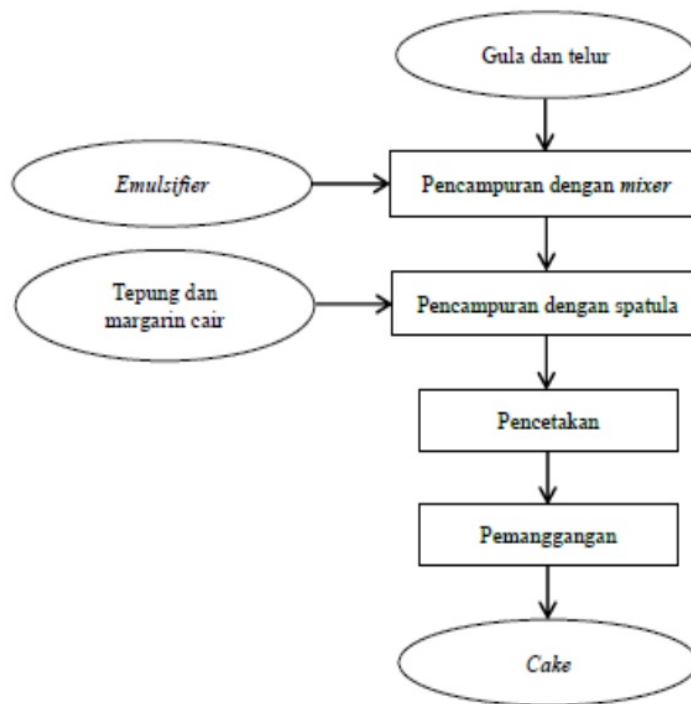


Figure 2. Cake making process

IV. RESULTS AND DISCUSSION

A. Flour Taro:

The initial stage in the manufacture of taro flour is to prepare the raw material taro tuber with good quality, avoided taro that begins to decay to get good quality flour. Umbu taro used a kind of gembili obtained from the region Sioban Mentawai. The raw material of taro flour production like picture 3 below.



Figure 3. Umbrella taro type that will be used as taro flour

After the taro tuber is prepared, it is done to strip the tubers that aim to remove the skin. On stripping the skin properly done with clean and cultivated no soil attached to taro tuber meat like Figure 4 below.



Figure 4. The process of stripping the taro tubers using a stainless steel blade

Furthermore, sieving is done to minimize tuber size using taro slicing machine becomes thinner and the size is uniform so that the surface area for evaporation becomes bigger so that accelerate drying. After that taro slices soaked in water bath with temperature 40°C for 3 hours. After soaking in warm water followed by soaking with 10% NaCl solution for 1 hour. Immersion with warm water and NaCl solution aims to reduce the oxalic acid levels that cause itching when eating taro [8]. After the immersion is soaked itchy mucus that enveloped taro then after immersion with NaCl washing with water flow first to remove the mucus. The process of slicing and soaking tuber taro tuber that has been sliced like picture 5 below.



Figure 5. The process of slicing taro tubers and taro tuber soaking results

Finish immersion followed by slicing for 10 minutes with the aim to dispose of existing water on taro slices. The next process is Drying. This drying is carried out by using a solar drier over para-para at temperatures $\pm 40^{\circ}\text{C}$ for 12 hours of drying. After the dry taro tubers are milled up into flour using a discmill type grinder. The grinder is equipped with 60 mesh sieve. After the milling, the flour escapes and does not escape sifted separately. The soured flour is then sifted back using an 80 mesh sieve to obtain a finer flour. As for drying process and milling machine like picture 6 below.



Figure 7. Taro tuber drying process using sunlight and disk mill grinding machine

Drying is the act of drying the material with solar energy in the open air with air humidity, air velocity and weather-affected temperatures. Drying by way of drying can be done by placing the material to be dried in places such as lamps / floor drying, mats, roofs, and on the highway. The advantages of drying that is not require special equipment and expensive and simple handling. While the disadvantages of drying this way are influenced by weather, longer drying time, uneven drying result and presence of dust contamination during drying.

Drying is the discharge of water from an agricultural product until it reaches a moisture content equal to that of normal atmospheric air. At the end of the drying condition, moisture content does not cause certain enzyme activity, fungi, and insects that can damage the quality [9].

According to Hubeis [2], drying is a way to remove most of the water from a material with the help of heat energy from natural sources (sunlight) or artificial (dryer). Drying of materials can be done in several ways, namely drying, artificial drying. Despite the drying process, the size reduction is done by grinding

Milling is the process of reducing the size of solids / granules with mechanical forces into various smaller size fractions. By reducing this measure, the material can be separated for its needs and enhances reactivity [2].

Size reduction, includes the following meanings: cutting, crushing and grinding and milling. Characteristics of diminution of sizes include using mechanical power without altering the chemical composition of the processed material and the size of the product The end corresponds or approximates the desired size. Some of the reduction objectives are: 1. Facilitate the extraction of certain elements and composition structures, 2. Adjust to product specification requirements or obtain a specific shape, 3. To increase the surface area of the solid, 4. Ease the mixing of the material evenly.

Next to the taro slices after being dried and obtained from the grinding machine grinding as shown in Figure 8 below.



Figure 8. Sliced taro tuber after dry and taro tuber flour yield

Results obtained from the process of making taro tuber flour, that the existence of soaking with 10% salt causes itching loss in taro tubers. This will certainly be very influential on the next work process. The result of flour obtained after drying was obtained with 40% flour yield, with flour content of about 10%. High flour yield results obtained because taro tubers contain carbohydrates so that the flour obtained becomes high. According to Linga [4] the process of making flour can be done in various ways depending on the type of tuber itself. The process of making taro flour begins with the washing and stripping of fresh tubers, which are then sliced. Slicing is intended to speed up the drying process. After that is done soaking with water. Soaking is also a washing process because it indirectly has a cleaning effect. Drying is then carried out at a temperature of about 50-60 ° C until the water content reaches 12%. Drying is done for 6 hours and usually dried bulb is flipped back and forth to dry evenly. The result of drying is a taro cake which is then ground to produce uniform taro flour.

B. Cake:

Cake is a "bakery" product made from flour, sugar, fat, and eggs. In the manufacture of cake is required the development of gluten and is usually used chemical developer materials and required the formation of water-complex emulsion in oil in which the water layer consists of dissolved sugar and dissolved starch particles [10].

The types of cake are chiffon cake, butter cake, genoise cake, and bread dough cake. For chiffon cake is lighter and softer. The technique of making egg whites and egg yolk are shaken separately, afterwards just mixed with other ingredients. Butter cake or cakementega, for this type of butter and sugar shaken first until soft, then other ingredients consecutively entered. How to make genoise cakesama with sponge cake, but the egg whipped while heated. This method produces a taste of cakeyang not filling. Cakeadonan bread though using yeast, these cakes are more commonly called cake because it is intact and decorated [11].

Power Flower Cake:

The level of cake development is determined by measuring the volume of cake before and after being processed. The development of cassava chiffon cake is closely related to the composition of the chiffon cake. The composition is wheat flour. Wheat flour is the basic structure or binder in all cake formulas. The materials used to produce the cake have different binder and hardener effects on cake batter. For this difference is caused by the varieties of wheat, grinding techniques, and the treatment of grinding. The effect of hardening of cake dough is found in the ground flour of different wheat varieties. In soft wheat stretched between 7-10%. This created a system that ultimately resulted in a softer and weaker cake texture [12].

Broadly speaking there are two types of wheat flour: hard flour (strong flour) and soft flour (soft flour). Hard wheat flour is usually used to make bread and products made by involving the process of fermentation as well as puff pastry. Wheat flour is usually used to make biscuits and cakes. The main difference between hard flour and soft wheat flour lies in its gluten content, where hard flour contains 13% gluten while wheat flour is a soft gluten content of about 8.3%. Gluten is responsible for the development of flour dough after added water and added developer or fermented ingredients using yeast. In the manufacture of wheat flour is often added additive ingredients that serve to improve the properties of wheat flour produced. One additive that can be added to the manufacture of wheat flour is L-cysteine (usually in the form of hydrochloride) which serves as an improving agent (improving the properties of wheat flour desired). Cysteine can soften gluten (the main protein of wheat that plays a role in the development of dough made from wheat flour).

In addition to wheat flour, sugar, margarine, egg yolks also have properties as emulsifiers and pengempuk. Improved flavors and colors help make the arrangement, enhance the taste and the grain become smoother and gentler [13].

According to U.S. Wheat Associates [13], in order to be able to judge the right cake there must be a picture of the perfect cake and at the same time to conclude it.

A. Symmetry

The term symmetry by itself is obvious. Common errors are usually in the form: low side, high side, low middle, middle height and uneven.

B. Sunny (Bloom)

The term bloom is related to the splendor of cake. Bright and good colors are very important. Bloom is a vibrant color trait.

C. Crust Color

The color of the crust differs according to the type of cake, thus for all types of cakes there is no certain limit on the color of the crust. The ideal color for a cake type should be known so that the color of the crust can be determined accordingly.

D. Volume

Although an experienced baker can accurately predict the volume, the best way is to adjust the volume to produce a cake that is eye-catching and has a good arrangement on the inside. Good cake volume is not too big and not too small, so the cake arrangement looks good.

E. Crust State

The crust situation is different according to the type of cake. Some types of cakes there should be more soft than the others. A good cake should not be too soft, so the cake is not crushed but a soft crust is still desirable.

F. Color Crumbs

Crumb colors differ from one another depending on the type of cake to be made. The bright crumb color remains favored no matter what type of cake is made. The color of the crumbs becomes old or young depending on the raw materials or the provisions of the formula.

G. Cake Pellets

Granules depend on cake type. Pound cakes, granules should be meeting; But other types of cakes granules should be tenuous until the meeting. It depends on the size, shape, and nature of the crumb cell structure. The uniformity of the size and thinness of the cell wall is the most desired factor. Poor grain is the cells are rough, thick, walled, uneven, and hollow large. To assess the grain, we must cut the cake in the middle.

H. Aroma

The smell of cake must be delicious. The air in the cell array that carries the scent must be fragrant, sweet, fresh, and pure.

I. Flavors

To determine the taste of cake, the best way is to taste a piece of cake. Chew thoroughly so that the actual taste of cake can be felt. Taste is an absolute combination of two elements: taste and smell. The desired flavor is similar to the desired flavor. What we like best is sweetness, delicious, and fun.

J. Quality Save

The quality of shelf cakes is very important, especially about the cakes sold wrapped in the pack, because cakes usually must be stored long before it comes to the consumer. The quality of each type of cake varies depending on the fatty acids, the method of manufacture and the materials used. However, regardless of the type of cake, each cake must have good shelf quality, it must always be in fresh / fresh state or remain moist and not ripe.

V. CONCLUSION

Based on the above description can be deduced as follows:

1. Taro tubers can be made flour taro with flour yield of about 40%
2. To relieve itching on taro tubers after stripping can be soaked with salt as much as 10%
3. Flour Bulbs taro can be processed into various processed foods such as cake, donuts

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