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## Research Article

### UTILIZATION OF CASSAVA (*Manihot utilissima*) AS THE MAIN MATERIAL IN THE MAYONNAISE MADE PROCESS

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#### ABSTRACT

Mayonnaise is one type of sauce made from eggs, vinegar and oil. Cassava mayonnaise is one of the alternative preparations at a cheap and easy to get price. Cassava is very low in fat and protein compared to cereals and nuts. So that utilization is still very limited. The purpose of this study is to make mayonnaise from cassava and consumer receivers to mayonnaise from cassava. The method of this research is descriptive explorative. The results of this study indicate that the panelists gave value a rather liking to color (4.75) and aroma (4.4.) Whereas the ratings favored texture (4.65) and taste (4.75). Carbohydrate analysis content of cassava mayonnaise at 20.16%.

#### Key Words:

Process, mayonnaise, cassava

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#### INTRODUCTION

Cassava (*Manihot utilissima*) is a type of plant that is very well known in Indonesia. This plant is planted by cuttings. Cassava is grown to be taken and consumed by leaves and tubers, while the stem is cut into pieces and can be used as seed cuttings. Cassava has many varieties, from many cassava varieties grouped into sweet cassava which is commonly consumed cassava and bitter cassava which is almost never used because it is toxic (KL Anindita, 2007).

Cassava is one of the most important types of cassava agricultural commodities in Indonesia both as a food source and as a source of food. This is due to the fact that cassava plants have several advantages compared to other food crops, including being able to grow in dry and infertile land, the resistance to disease is relatively high, the harvest period is not hunted for time so that it can be used as a barn for life. In addition, leaves and cassava can be processed into various foods, both main and distant foods (AJ Karimullah, 2015).

Cassava is a source of energy that is rich in carbohydrates but very poor in protein. A good source of protein is found in cassava leaves because they contain amino acid methionine. Cassava yams can be eaten raw. The main content is starch with a little glucose so it tastes a little sweet. In certain

circumstances, especially if oxidized, toxic glucosides will form which then form cyanide acid (HCN). This cyanide will give a bitter taste. Sweet bulbs produce at least 20 mg of HCN per kilogram of fresh tuber, and 50 times more in bitters that taste bitter. The cooking process can effectively reduce toxicity. From starch this tuber is made tapioca flour (starch). Cooked in various ways, cassava is widely used in a variety of dishes. Cassava can be processed and utilized as flour, cassava flour can be used to replace wheat flour, good for people with allergies (Ayu, 2014).

The author tries to make mayonnaise from the type of sweet potato as one of the processed foods, because the price is cheap and easy to get. Cassava is very low in fat and protein compared to cereals and nuts. As with other roots and tubers, cassava tubers are also gluten free. Gluten-free sparkles are used in special food supplies for patients with celiac disease.

The objectives of this study include: knowing the processing of mayonnaise made from cassava, knowing the characteristics of organoleptics, and knowing the carbohydrate content of cassava mayonnaise products. In addition, it is expected that from this study, it can introduce and increase the economic value of cassava plants, contribute to innovation in processing techniques for tubers, and increase the diversity of food products made from tubers

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**Literature Review**

**Cassava**

Cassava has long been known and planted by people in the world. The search results of botanists and agriculture experts show that cassava plants come from tropical regions of America. Nikolai Ivanovich Vavilov, a Soviet botanist, confirmed the centrum of the cassava plant germplasm was Brazil (South America). The first spread of cassava occurred, among others, to Africa, Madagascar, India, China, and several countries that are well-known in their agricultural areas. In subsequent developments, cassava spread to various countries in the world which are located in the position of 300 North Latitudes and 300 South Latitudes.

Cassava plants entered the territory of Indonesia more or less in the 18th century. Precisely in 1852, imported cassava germplasm from Suriname was collected in the Bogor Botanical Gardens. In Indonesia, cassava is the number three staple food after rice and corn. The spread of cassava plants extends to all provinces in Indonesia. Cassava has now been cultivated as an agro-industry commodity, such as tapioca flour products, fermentation industries, and various food industries. Potential markets for tapioca flour include Japan and the United States. Each year the two countries import ± 1 million tons of flour products, consisting of 750,000 tons of tapioca flour and 250,000 tons of other flour. In addition to tapioca flour, it turns out cassava products, chips, and pellets are also likely to be exported (Rukamana, 2002).

**Chemical and Nutritional Content**

Cassava is one of the high carbohydrate food sources. carbohydrates in cassava are dominated by starch. In areas where food shortages are plant substitutes (substitution) and can also be used as the main carbohydrate source (Sunarto, 2002). The types of polysaccharides that make up cassava tubers include starch, seluosa, and hemicellulose (Winarno, 2004). Chemical composition can be seen as in the following table:

**Table 2.1** Chemical Composition of Cassava

Nutritional composition	Fresh cassava (%)	Cassava flour (%)
Water	57.00	8.65
Ash	2.46	2.55
Fat	-	6.54
Protein	-	1.81
Carbohydrate	85.86	80.45
Starch	74.81	62.54
Coarse fiber	11.05	2.69
Cellulose	-	0.36
Hemicellulose	-	1.88
Lignin	-	0.02

Sources :(a) Susmiati (2010), (b) Arnata (2009)

Carbohydrates contained in cassava consist of crude fiber and starch. crude fiber consists of cellulose, hemicellulose and lignin which functions as a texture enhancer. The carbohydrate component is the main raw material that can be used as raw material for making ethanol (Winarno, 1992). Cassava contains many benefits for body needs. besides containing carbohydrates, cassava also contains protein, vitamins, iron, calcium, and phosphorus. High iron content is found in the skin rather than in tubers. Cyanide is classified as a toxic compound

and is a limiting factor in the use of cassava plants (Akinfala *et al.*, 2002). the nutritional content of cassava can be seen in Table 2.2

**Table 2.2** Nutritional content in every 100 g of cassava

Nutritional composition	White Cassava	Yellow Cassava
Calories (cal)	146.00	157.00
Protein (g)	1.20	0.80
Fat (g)	0.30	0.30
Carbohydrates (g)	34.70	37.90
Calcium (mg)	33.00	33.00
Fospor (mg)	40.00	40.00
Iron (mg)	0.70	0.70
Vitamin A (SI)	0	385.0
Vitamin B1 (mg)	0.06	0.06
Vitamin C (mg)	30.0	30.0
Water (g)	62.50	60.00
Edible portion (%)	75.00	75.00

In addition to the above nutritional content, cassava also contains large amounts of toxins which are quite dangerous. The known cassava poisons are blue acid or cyanide acid (HCN). Both leaves and tubers contain a cyanogen glycoside, meaning an organic bond that can produce HCN that is very toxic (Sosrosoedirdjo, 1993).

The amount of poison in cassava for each variety is not constant and can change. This is due to the existence of several influencing factors, among others: climate conditions, soil conditions, fertilization methods and cultivation methods (Sosrosoedirdjo, 1993).

Source: Directorate of Nutrition, Ministry of Health R.I., 1981 (Sunarto, 2002)

**Usability**

Cassava can be made into food ingredients such as cassava chips, cassava and tiwul croquettes. Here we will discuss how to make simple tiwul into delicious tiwul. Cassava tubers (cassava / cassava) have long been known to the Indonesian people as one of the important food ingredients as a source of carbohydrate intake. During this time, people in rural areas usually consume cassava by cooking it directly (boiled, steamed and fried) or dried it first, under the hot sun to make cassava (Santoso, Adi.2012).

**Mayonnaise**

Mayonnaise is a sauce that comes from eggs, vinegar and oil. Mayonnaise is included in processed food ingredients which are widely used for dressings and dipping. Mayonnaise has a yellowish white, thick, and a savory taste slightly sour. mayonnaise is sold in bottle packaging. Mayonnaise is often found in western countries. kebaratan cuisine generally uses mayonnaise as a complement. mayonnaise is reduced to various types such as aioli with a mixture of garlic and olive oil, tartar sauce with a mixture of pickled cucumber, spicy mayonnaise with a mixture of chili sauce, thousand island with a mixture of spices and pickles, tabasco or buffalo wing, mayonnaise with a mixture of lime juice and other mayonnaise types.

**Additional Materials**

**Chicken eggs**

In making mayonnaise, what is needed is egg yolk, mostly composed of lipoproteins, an emulsifying agent and a good

stabilizer of all eggs. Egg yolk lipoprotein is colloidal as water is absorbed between oil and water. Egg yolks are of great benefit in making mayonnaise. (Maxes, 1998).

### Salt

Salt is a solid, crystalline, and white substance which is the result of the sea. Salt is obtained by drying the seawater so that mineral crystals are derived from sea water. Salt itself has a salty taste. Salty taste is obtained from salty sea water. Salt miners usually take advantage of the scorching sun to dry up sea water. Packed and sold salts are generally in the form of powder or chunks in plastic. Salt also consists of various kinds, but what is familiar is cooking salt and fine salt or table salt. Cooked salt in the form of crystals or powder with a less white color. Generally the iodine content is not as high as table salt or fine salt. Smooth salt or table salt is usually smoother and has a high iodine, but tastes less salty (Meilisa kusumawati, 2017).

Salt or NaCl in making mayonnaise as a salty flavor in mayonnaise. In addition, salt also serves to strengthen the emulsion between oil and water in a mixture of mayonnaise. The addition of salt 0.5% -1.7% can improve the stability of an emulsion system. Increasing the viscosity of the yolk by adding salt has an effect on the stability of the emulsion system (Paundrianagari, 2011).

### Sugar

Sugar is a simple carbohydrate that is the main source of energy and commodity trade. The most sugar is traded in the form of solid sucrose crystals. Sugar is used to change the taste to sweetness and the state of food or drink. Simple sugars, such as glucose (which is produced from sucrose with enzymes or acid hydrolysis), stores the energy that will be used by cells (Anonymous, 2011).

Besides being a sweetener, sugar also functions as a texture, preservative and flavor maker (Widayanti *et al.*, 2013). In making mayonnaise, sugar serves to give a special taste to mayonnaise. Sugar and salt will mix in the mayonnaise mixture giving a distinctive taste to mayonnaise (Palma, *et al.*, 2004).

### Vinegar water

Vinegar is an organic acid that is safe to use as a food preservative. vinegar is a preservative that is active in inhibiting the growth of molds and also pathogenic bacteria associated with food products such as bread products and pikel (Pundir and Jain, 2010). Vinegar acid is obtained from yeast alcohol fermentation followed by oxidation by acetic acid bacteria from foods containing sugar or starch. Vinegar acid acts as a giver of sour taste, a serving medium, and also inhibits damage to mayonnaise by microorganisms (Mutiah, 2002).

### Margarine

Margarine is an emulsion of water in fat. Fat phase is a liquid in the form of vegetable oil mixture, some of which has been compacted with hydrogenation to obtain the desired plastic properties of the final product. Fish oil and animal fat can also be mixed in the mixture. The hydrogenation process is carried out by putting the tank oil closed large and pressurized. Hydrogen gas is sprayed as bubbles into the oil, fine nickel powder is used as a calisator which will then be separated with oil by filtration. Furthermore, the oil mixture is mixed with the water phase, which consists of milk which is acidified under

certain conditions to give the desired flavor to the final product (Gaman *et al.*, 1994).

Margarine can be used directly for frying or smearing on bread so that the ingredients become more delicious and delicious, In general, margarine has a denser texture than butter and has an emulsifier with better ability. and several other types of wet rice. Only, lack of margarine lies in its distinctive aroma and tends to be acidic because it contains high levels of unsaturated fat (Sidik, 1997).

## METHODOLOGY

### Types of research

This type of research is an explorative description research. Research explorative description aims to describe the state of a phenomenon and is not intended to test certain hypotension but only describes what a variable is symptoms or circumstances (Arikunto, 2002).

### Research focus

The focus of the research is the utilization of cassava as the basic ingredient in making mayonnaise.

### Place and time of research

The process of making taro flour and yogurt is located in the post-harvest laboratory of Yogyakarta AIAT, the time of implementation August 1 to September 28, 2018.

## MATERIALS AND TOOLS

### Material

The material used in making mayonnaise cassava trees covers: cassava 300 g; 1 egg yolk; Salt 12 g; Sugar 35 g; 21 ml vinegar water; Margarine 19 g; Water 300 ml.

### Tool

The equipment used in making tree cassava mayonnaise includes: stainless knives, analytical scales, bowls, blenders, panes, stoves and plastic gloves.

### Ways of working

The stages in making mayonnaise made from raw wood are as follows:

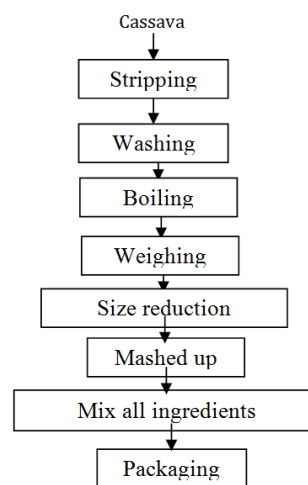


Figure 1 Flow chart for making mayonnaise

**Product Analysis**

Product analysis is carried out namely sensory analysis and chemical analysis

**Sensory analysis**

Sensory analysis or organoleptic test is a test carried out to assess members of products that use the five senses namely vision, taste, smell, touch and hearing. In testing the sensory tree cassava mayonnaise which is used as limited to the senses of sight, taste, smell and touch, because the parameters tested regarding color, taste, aroma, texture (smoothness) of mayonnaise produced. Rating scale 1-7 with rating 1 = very dislike; 2 = dislike; 3 = rather dislike; 4 = rather like; 5 = likes; 6 = the likes  
7 = very very dislike

**Chemical analysis**

Chemical analysis is a test conducted to determine the functional properties of the resulting cassava mayonnaise products, namely carbohydrate content (Luff Schoolr method).

**RESULT AND DISCUSSION**

**Product Description**

Mayonnaise products are made from cassava mixed with spices. The composition of cassava mayonnaise composition is as follows:

**Table 1** Mayonnaise composition

Material	Amount
Cassava	300 g
Egg yolk	1 butir
Salt	12 g
Sugar	35 g
Vinegar water	21 ml
Margarine	19 g
Water	300 ml

**The Process of Making Cassava Mayonnaise Trees**

The stages of making Mayonnaise from Cassava are as follows:



**Figure 2** Stripping



**Figure 3** Boiling



**Figure 4** Weighing



**Figure 5** Size reduction



**Figure 6** Smoothing or grinding



**Figure 7** Mixing



**Figure 8** Packaging

**Chemical Analysis**

The cassava mayonnaise products produced were then tested for carbohydrate content. Testing carbohydrate content with the luff scroll method. The results of carbohydrate testing in cassava mayonnaise were 20.16%.

### **Sensory Analysis**

Based on the average value of 20 panelists it is known that the panelists gave a rather liking assessment of color (4.75), and aroma (4.4); and the likes of texture (4.65), and taste (4.75). Organoleptic test and data in the form of questionnaires.

#### **Color**

Color is an important characteristic to assess the quality of a product, color is the attraction of a product so that the product is enjoyed by consumers. Color is the first determining parameter to determine the level of consumer acceptance of a product, one of which is cassava mayonnaise products. From the results of sensory analysis which can be seen in table 4.3, that is done through a hedronic test of cassava mayonnaise products produced. It can be seen that the panelists or the average consumer rather like the cassava mayonnaise. Mayonnaise of cassava which looks yellowish pistil is an influence why panelists and consumers rather like the cassava mayonnaise

#### **Taste**

Taste is a sensory attribute that can be done by tasting (the sense of taste) using the tongue. the taste is complex and is related to the taste of the product, which consists of four elements which are salty, manis, bitter and savory. the taste of cassava mayonnaise is the main attribute that greatly influences consumer acceptance of the product. From the results of sensory analysis carried out on cassava mayonnaise products shown in table 4.3, the average panelist liked the taste of cassava mayonnaise produced.

#### **Texture**

Texture is a sensory attribute that can be done by touching using tanagan's fingertips. Textures are kopleks and related to the product. Which consists of two elements, namely soft and soft. The texture of cassava mayonnaise is a very sensory attribute that affects consumer acceptance of the product. From the results of sensory analysis carried out on cassava mayonnaise products shown in table 4.3, the average panelist liked the texture of the cassava mayonnaise produced.

#### **Aroma**

Aroma is a sensory attribute that can be done by using the nose. The aroma of cassava mayonnaise is a sensory attribute that greatly influences consumer acceptance of the product. From the results of sensory analysis carried out on cassava mayonnaise products shown in table 4.3, the average panelist liked the aroma of cassava mayonnaise produced.

## **CONCLUSION AND SUGGESTION**

### **Conclusion**

**Based on the Results of Research on Making Cassava Mayonnaise, it can be concluded that**

1. The process of making cassava mayonnaise D: stripping, processing can be carried out through the following stages: stripping, washing, boiling, molding, grinding and packaging. by mixing sugar, salt, margarine, water, egg yolks and vinegar.
2. Based on the average value of the 20 panelists it is known that the panelists gave a rather favorable

assessment of color (4.75), aroma (4.4); and the likes of texture (4.65), taste (4.75). Organoleptic test process.

3. Tests carried out in determining the amount of carbohydrate content using the luff scroll method. After testing, carbohydrates in cassava mayonnaise were 20.16%.

### **Suggestion**

**For the Continuation of the Manufacture of Cassava Mayonnaise trees need Action or Things that Need to be Considered Including**

1. It is necessary to provide better quality raw materials.
2. There needs to be innovation for processing cassava trees so that in the future, it will become more useful processed ingredients to be better known to the public.
3. In the manufacturing process, the mill should use hot water so the tree cassava is smooth and evenly mixed

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