



MORINGA MUFFINS AS A CAKE PRODUCT INNOVATION DURING THE COVID-19 PANDEMIC

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Abstract - The COVID-19 pandemic has made various economic sectors in Indonesia experience a decline, one of which is the tourism sector. However, the East Nusa Tenggara provincial government is optimistic to again boost the local economy through tourism. By developing community-based tourism and empowering micro and small businesses. Then, tourism development based on local resources is carried out as the main driver. The tourism industry is designed to encourage and attract other economic sectors in East Nusa Tenggara, most of which are locally based supply chain processes, one of which is Moringa.

Several supplies of anti-oxidant substances that can avoid the COVID-19 pandemic can be obtained from Moringa (moringa), so that marungga processed products are acceptable and very beneficial for public health now and in the future. With the manufacture of moringa muffins, it is hoped that consumers will no longer feel boredom because Moringa itself has a slightly bitter taste. The Moringa muffin product is demand drive downstream Moringa powder raw materials into ready-to-eat food according to the target market and the needs of the people of NTT. The formulation of the problem in this study is how to find the right recipe for Moringa powder for cake products, namely moringa muffins? and how is the public's acceptance of the moringa muffins?

The main objective of this research is to find a real solution by applying Moringa to moringa muffin products that have economic value. This research was conducted using a research and development (R&D) model the method chosen in this research is 4D, namely define, find recipes; design, design recipes and modify them with Moringa powder innovation; develop, develop recipe references and apply them to research selected food products (moringa); disseminate, disseminate research products ready for consumption to the public.

The research was carried out at the Catering Laboratory of the Tourism Department of the Kupang State Polytechnic from May 2022 to August 2022. The data analysis method used a sensory test form and was analyzed descriptively with percentages. from the research results, the right Moringa

Muffin recipe uses 100% Moringa flour. Moringa muffins are processed using baking and blending techniques. 2) public acceptance of Moringa Muffin products is a value of 3 being preferred. Moringa Muffin products are liked and become a worthy product to sell products

Keywords: *Innovation, Moringa Muffin, Covid 19 Pandemic*

Pasifikus Mala Meko

I. INTRODUCTION

Maintaining immunity during the COVID-19 pandemic is a must. One effort that can be done is to pay attention to the nutritional intake of each food consumed. Nutritional intake can be obtained by diligently eating various types of vegetables such as Moringa leaves. Moringa leaves contain benefits such as essential vitamins, minerals, amino acids, antioxidants, anti-inflammatory and compounds Hesperidin, Rhamnetin, Kaempferol, Quercetin, and Myricetin as compounds that have the potential to inhibit and prevent the COVID-19 virus (Syam, 2020). Moringa leaves are a type of nutritious vegetable that is easily found in the province of East Nusa Tenggara, especially on the island of Timor, which has the capital city of Kupang. The local government always urges the community to always cultivate the cultivation of Moringa and consume Moringa which is clinically proven to be useful for preventing various health problems such as malnutrition, stunting, and COVID-19 [1].

Moringa leaves can be consumed directly by humans, but not many people consume them because these leaves have a characteristic smell of leaves so they are not liked. Moringa in rural areas is only processed as clear vegetables and fresh vegetables [2]. Although based on research, Moringa leaves have been shown to provide many benefits for the health of the body, the utilization of Moringa as food is very low [3]. In fact, the addition of a spoon or more of dried Moringa leaves in powder form is recommended by Church World Services

(CWS) as a highly nutritious food ingredient, especially for children [4]. The addition of Moringa powder in food products to add nutritional value has been carried out in the form of biscuits [5], meatballs (Evivie, et al., 2015), yogurt (Diantoro, et al., 2015), and candy (Rahmawati, 2015). 2016)[7]. The sale of moringa products has been carried out by the Timor Moringa industry since 2018. This food-based industry sells various products of moringa raw materials such as moringa powder and health moringa tea to meet the nutritional intake of the community, especially in East Nusa Tenggara. However, with the limited application of processed raw materials, of course this industry has limitations in reaching a wider market because the processing of raw materials for Moringa products is still not optimal.

This research seeks to provide solutions for industries that focus on the application of the use of Moringa leaf powder as a composition in ready-to-eat food preparations, namely muffins. With the application of the use of Moringa leaves as a ready-to-eat muffin, it will certainly attract the interest of the wider community and provide health benefits so that the nutritional content can be maximally absorbed by the body. Based on these problems, an applied research is needed regarding the application of the use of Moringa leaves in ready-to-eat muffin products that can be used as food supplements that are in demand during the pandemic. The application of Moringa leaves on muffins is expected to encourage integrative applied research by responding to market needs for ready-to-consume products that are in line with the vision of the local government in alleviating stunting health problems and increasing body immunity during the pandemic.

Based on the explanation above, the urgency of this research is to optimize the application and utilization of Moringa leaves as a ready-to-eat food that is in demand by the public. The Moringa muffin product is demand driven by downstreaming Moringa powder raw materials into ready-to-eat food according to the target market and the needs of the NTT community, which during the pandemic requires complete nutritional intake every day.

The formulation of the problem in this applied research study are (1) How to find the right recipe for Moringa powder in pastry products, namely moringa muffins? (2) How is the public's acceptance of the moringa muffins? In addition to answering these problems, this applied research is also designed to find solutions in optimizing industrial profits that will have a broad impact from all aspects, both economic and social.

II. LITERATURE REVIEW

A. *Development Strategy*

Moringa is the most widely cultivated species of the monogeneric family. This fast-growing tree has been used since ancient times by the ancient Romans, Greeks and

Egyptians and until now is widely cultivated and has become a naturalized plant in the tropics (Fahey, 2005). Currently, Moringa plants are widely studied regarding their composition which can be used for various fields. Several articles have reviewed related to the Moringa plant as a type of plant that has various benefits in various fields. In the food sector, Moringa plants have been used to treat malnutrition, especially for toddlers and nursing mothers.

Moringa leaves can be consumed fresh, cooked, or stored in powder form for several months without refrigeration and without loss of nutritional value. The process of processing Moringa leaves into flour will increase the calorific value, protein content, calcium, iron and vitamin A. This is because during the processing of Moringa leaves into flour there will be a reduction in the water content contained in Moringa leaves [8].

Muffins are a type of cake in the form of a cake with a practical shape, easy and quick to make which is usually served for breakfast, school lunch, or office and also to accompany tea or coffee in the afternoon. Muffins can be a reliable choice of food, because muffins can be made into a complete dish of nutrition from carbohydrates, protein from meat and eggs, vitamins and minerals from fruits and vegetables can be included in it.

Cake is a product obtained from baking dough containing flour, sugar, fat, eggs, milk, water (U.S. Wheat Associates, 1983: 67). In making muffins, the dough used is liquid dough. The basic cake only consists of flour, eggs, sugar, and fat. The explanation of each ingredient used in making muffins is as follows.

A. Flour

Flour is the most important ingredient in making cakes which is used as a form of structure and binds other ingredients (Henny Krissetiana, 2013: 2). In addition, according to Fanny et al. (2004:12), flour also functions to form dough well. When the dough is raw, in the cooking process or after it is cooked and gives good quality, color and taste to the product.

According to the type, wheat flour is divided into three types, namely (1) High protein flour (Hard/Strong Flour) with a protein content of 11-13%, (2) Medium protein flour (Medium Flour) with a protein content of 9-11%, and (3) low protein flour (Soft/Weak Flour) with a protein content of 7-9% (Subagjo, 2007:20). In its manufacture, muffins require wheat flour with low to medium protein content because the low protein content helps during the mixing process because it blends more easily with other ingredients. The drawback, this type of flour is not suitable for making bread (bread), this is because the ability to absorb water is less so it is difficult to stir and ferment .

B. Fat

Fat is the most important component in pastry making. The use of fat in the manufacture of cake and bakery products can produce products with larger volumes, fine crumb structure,

uniform and more tender). In making cakes, there are several kinds of fat that can be used, namely butter, margarine, and oil.

- Butter is a solid fat that is most often used in the processing of cake and bakery products. Butter is made by separating cream from milk) so that butter has a better flavor than most other solid fats. According to Henny Krissetiana (2013:12) in its use, butter is mixed in the dough in 2 forms, namely whipped butter and melted butter.

- Margarine is a fat substitute for butter / butter. The appearance resembles butter, but the basic ingredients of margarine are obtained from vegetable ingredients. Margarine is a water-in-oil emulsion that resembles butter (appearance and composition) and is used as an alternative to butter ().

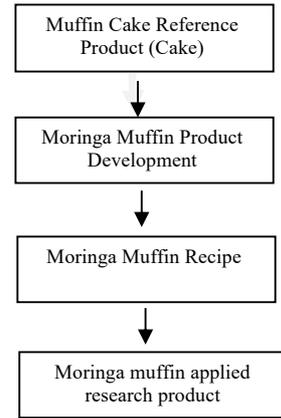
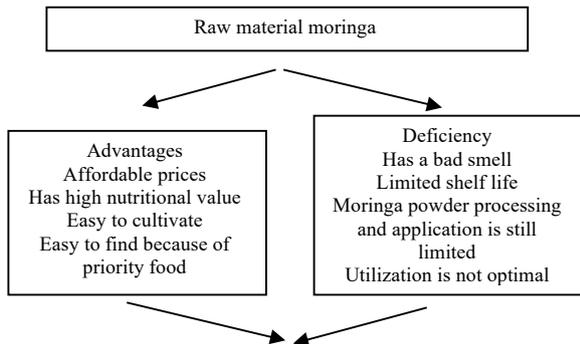
- Oil is a type of fat with a low melting point because it is a liquid form. Generally oil is used in making chiffon but there are some cakes that also use oil.

C. Sugar

Sugar is a sweetener in the manufacture of food products such as cakes, cookies, muffins, and others. The sugar that is often used is caster sugar. Caster sugar is sugar that is finely granulated so it dissolves easily. Caster sugar can be made yourself by blending white sugar. The function of sugar in addition to providing a sweet taste also provides aroma and as a natural preservative and provides a good shape and texture.

D. Eggs

Eggs commonly used in the manufacture of muffin cakes (cakes) are chicken eggs. The function of eggs in pastry is to help form structure, increase volume, add nutrition, add flavor, increase color, add tenderness. The use of eggs in each part of the dough, egg yolks, egg whites, or both have different effects. If the dough uses egg whites, the volume of the dough will be very large because in the dough there are large and irregular air bubbles so the dough will quickly become deflated because the network becomes too weak. If the dough uses egg yolks only, the volume of the dough is small because in the dough there are fine air bubbles so that the tissue becomes strong and not easily deflated. Meanwhile, if the dough uses both (yolk and egg white) then the dough has a medium volume and the network is neither too strong nor too weak ().

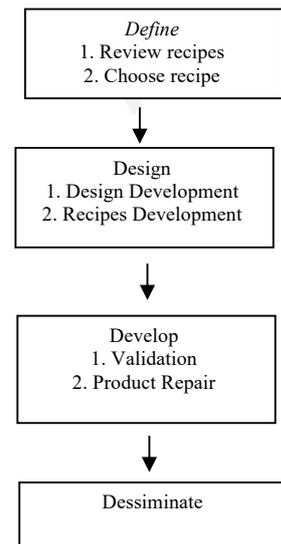


Picture 1. Thinking scheme of the research study

II. METHOD

This type of research is experimental because in the research process there is variable manipulation. The type of research data collected in the form of primary data consisting of organoleptic properties of moringa muffins which include color, aroma, taste, shape, crispness, crumbs and level of preference. The method used in this research is observation, and in its completion the researcher uses research and development procedures (Research and Development). According to Sugiyono (2016: 297) Research and Development Methods (Research and Development) are research methods used to produce certain products, and test the effectiveness of the product. Research and Development or Research and Development (R&D) is a process or steps to develop a new product, or improve an existing product, which can be accounted for.

In this study, the product to be produced is a muffin made from moringa/moringa. This research procedure goes through 4 stages:



Picture 2. Research procedure diagram

1. Define (find stage)

The goal at this stage is to develop object specifications (choose a recipe). At this stage, the recipe concept is analyzed and then converted into an arrangement of specifications. The recipe design consisted of three different sources with varying results.

2. Design (planning stage)

The goal at this stage is to design a prototype of the selected recipe. At this stage, the process of changing the selected recipe is carried out by completing the criteria.

3. Develop (development stage)

The goal at this stage is to modify the prototype by means of expert appraisal and development so that it becomes a product that is ready to be marketed. Expert appraisal is a technique for validating or assessing the feasibility of a product design. Development testing is a product design trial activity on the real target subject, the test results are used to improve the product. After the product is repaired, it is then presented again until effective and efficient results are obtained

4. Disseminate (marketing/introducing stage)

The purpose at this stage is to obtain validation of recipe products. At this stage, product validation, organoleptic testing, biological testing and product dissemination were carried out. In this research and development is carried out to find recipes and find out processing techniques that are in accordance with the development of food service products. The product developed is Moringa Muffin

Reference Recipe for making Moringa Muffins

Material	Number	Size
1 wheat flour	85	grams
2 cocoa powder	15	grams
3 egg	2	pcs
4 baking powder	1/2	teaspoon
5 fine salt	1/8	teaspoon
6 unsalted butter	60	grams
7 refined sugar	65	grams
8 milk	200	ml

How to make:

- Mix all dry ingredients, sieve, set aside.
- Mix all wet ingredients except silverqueen chocolate pieces, set aside.
- Make a hole in the center of the dry ingredients mix, add the silverqueen chocolate.
- Then slowly pour the mixture of wet ingredients, while stirring using a spatula or balloon whisk.
- Stir without needing to be too smooth to avoid lumpy results.
- Prepare a muffin tin or muffin cup, pour the batter 3/4 of the mold.
- Then sprinkle chocolate chip or dark flake.

- Bake at 180 ° C until cooked or about 25 minutes. Don't forget to do a toothpick test to check doneness.

III. RESULT AND DISCUSSION

Moringa muffins are a type of muffin developed with 100% substitution of Moringa flour. This muffin originally used wheat flour and eggs as the main ingredients. There are 2 processing techniques used in making Moringa muffins, namely baking and blending. Baking is a food processing technique using hot air in the oven. (www.resepkit.com). Blending technique is a processing technique by mixing all the ingredients together.

Results and Discussion

1. Moringa Muffin Recipe

a. Define stage

The raw material for muffins is generally wheat flour. Wheat flour is an ingredient that must be imported, so its presence is feared to be decreasing. So in making these muffins flour must be replaced or substituted. This muffin raw material was then replaced with Moringa flour because Moringa is a type of fruit that can be used in the manufacture of food products to explore the potential of local food, Moringa can also add nutrition and its presence in Indonesia is very abundant and easy to find. The resulting product will have muffin criteria in general so that this product can be accepted by the community. Of the various standard recipes for making muffins, finally two reference recipes can be selected to be tested, the recipe with the best product results will be used as the standard recipe for making muffins with Moringa flour substitution.

Here are those recipes:

Muffin Reference Recipe

Reference Recipe Ingredients 1

- 50 grams of butter (butter)
- 80 grams of sugar
- 2 eggs
- 200 cc of liquid milk
- 100 grams of raisins
- 250 grams of wheat flour
- 1 tablespoon of baking powder
- cooking chocolate to taste

Reference Recipe Ingredients 2

- 200 grams of flour
- 100 grams of sugar
- 30 grams of powdered milk
- 35 grams of cornstarch
- 3 grams of baking soda
- 2 grams of baking powder
- 30 grams of cocoa powder
- 1 tsp ground coffee
- 2 grams of salt

- 1 pack of silverqueen chocolate (coarsely chopped)

Liquid Material:

- 2 eggs
- 65 grams of margarine / butter (melted)
- 65 grams of liquid milk
- 65 ml of water

The trial of the two recipes above, obtained almost the same results in terms of taste, recipe number 2 is better than the first recipe. Based on the results of three reference recipes for muffins, recipe II was obtained as a reference recipe because it has good sensory properties, namely it has a fresh taste from coffee, for a soft and crunchy texture, and for yellowish-white cream. The following are selected reference recipes.

- Mix all dry ingredients, sieve, set aside.
 - Mix all wet ingredients except silverqueen chocolate pieces, set aside.
 - Make a hole in the center of the dry ingredients mix, add the silverqueen chocolate.
- Then slowly pour the mixture of wet ingredients, while stirring using a spatula or balloon whisk.
- Stir without needing to be too smooth to avoid lumpy results.
 - Prepare a muffin tin or muffin cup, pour the batter 3/4 of the mold.
 - Then sprinkle chocolate chip or dark flake.
 - Bake at 180 ° C until cooked or about 25 minutes. Don't forget to do a toothpick test to check doneness.

b. Design stage

After previously obtaining a standard recipe for a good muffin, the next step is to make a moringa muffin product which is substituted with moringa flour, with a percentage of moringa flour 60%, 80%, and 100%.

Muffin Recipes Substitution of Moringa Flour Selected Reference Recipe Ingredients Recipe Design I (60%) Recipe Design II (80%) Recipe Design III (100%)

Wheat flour 300 gr 120 gr 60 gr T
 Moringa flour 180 gr 240 gr 300 gr
 Butter 25 gr 25 gr 25 gr
 Margarine 175 gr 175 gr 175 gr
 Egg yolk 2 eggs 2 grains 2 grains 2 grains
 Milk powder 30 gr 30 gr 30 gr
 Maizena 50 gr 50 gr 50 gr

I Recipe Design Characteristics

Product Characteristics based on panelists, Color Good, Good taste, sweet Good, sweet Aroma Good, Good texture, crunchy Good, crunchy. Based on the results above, moringa muffins still have similarities with Control Recipes so that the substitution of moringa flour can be increased. Then made changes back to the recipe design II.

Recipe Design Characteristics II

Product Characteristics based on the panelists, Color Good, brownish yellow Good, brownish yellow Good taste, sweet Good, sweet Aroma Good, banana aroma Good, banana aroma Good texture, crunchy Good, crunchy Results Based on the results above cookies still have similarities with the Control

Recipe so banana flour substitution can be increased. Then made changes back to the draft recipe III. Characteristics of Recipe Design III Product Characteristics according to panelists Color Good, Good Taste, Sweet Good, Sweet Good Aroma, Texture Good, crunchy Good, crunchiness Results Based on the results above cookies still have similarities with Control Recipes so this recipe III will be in the development stage

c. Development stage

This recipe that is considered the best will then be validated by the lecturer up to 2 times. Validation is carried out by experts, namely the Head Chef and Examiner Lecturer and Culinary Laboratory Institutions. Based on the results of validation I in making moringa muffins, it was good in terms of color, taste, aroma, and texture so it did not require validation stage II. Characteristics of Muffin Moringa Validation I Product Characteristics according to panelists Color Good, Good taste, sweet Good, sweet Aroma Good, The result of validation I is Muffin Moringa has attractive color characteristics, good taste, good texture. There is no change because it is already interesting so no validation is needed II

Moringa Muffin Final Recipe:

Moringa flour 300 gr
 Butter 25 gr
 Margarine 175 gr
 Egg yolk 2
 Milk powder 10 gr
 Maizena 50 gr
 Baking powder 1tsp
 Granulated sugar 160 gr

d. Disseminate stage

The panelist test was carried out by 30 semi-trained panelists, in the Kitchen Laboratory Room, Kupang State Polytechnic Tourism Department. To find out the results of the panelists' preference for the product, a panelist test was carried out using the organoleptic method, namely the preference test used to examine the panelist's reaction to a product by assessing various aspects, namely in terms of color, aroma, texture, and taste. The results obtained can be seen in the following table:

Characteristic	Muffin Moringa	Description
colour	3	like
taste	3	like
aroma	3	like
teksture	3	like
total	3	like

CONCLUSION

Based on the results of the analysis and the data obtained from the research results of making Banana Cheesecake and Sumtepi products, it is concluded with the following

objectives: 1. The right recipe in making Moringa Muffins is a 100% substitution of wheat flour with Moringa flour. The right processing techniques in processing Moringa muffins are baking (baking with a hot temperature from the oven) and blending (mixing all ingredients together). The public's acceptance of the product, namely Muffin Moringa, has a "preferred" level of preference, which is 3 in 30 panelists.

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