

Mocavita: The Healthy Noodles As A Functional Food Inovation For Stunting Prevention

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Abstract. *Stunting is one of the global scale problems in the health sector. Stunting is the condition of impaired growth and development of the children. Stunting is related to the increases in morbidity, death, and decreased or inhibited physical, motoric or functional body and mental growth especially in children. Based on Riset Kesehatan Dasar (Riskedas), Indonesia is ranked 2nd highest stunting cases in Southeast Asia and the 5th highest in the world in 2018. One of the major causes of stunting is nutritional fulfillment or nutrient intake, absorption and utilization of mother or children. Therefore, it is needed to make functional food innovation that can solve this problem. This study aim is to make a functional food innovation based on healthy noodles for children also mother to prevent stunting. This study was carried out by making healthy noodles namely Mocavita. Mocavita is made from kenikir, pumpkin, mocaf flour and mung beans flour as ingredients which then creates into 3 formulas (F1, F2 and F3). Organoleptic test was conducted to know which one of the formulas that is most liked by people. It is found that Mocavita made from Formula 1 is the best and the most liked by 30 panelists.*

Kata kunci: : functional food innovation, kenikir, mocavita, noodles, pumpkin, stunting

INTRODUCTION

Some social problems that occur among people around the world can be categorized into international problems level. These problems usually have a high number of cases and occur widely in several areas of the world. One of these problems is stunting. Stunting is one of the problems in the health sector which is related to nutritional problems in children. The World Health Organization (WHO) defined stunting as a condition of impaired growth and development of the children (WHO, 2011). Stunting children has a height-for-age below two standard deviations of the WHO Child Growth Standards median (Hadi *et al.*, 2021)

Indonesia is a country with the 2nd highest stunting cases in Southeast Asia, and the 5th highest in the world in 2018 based on the data reported by Riset Kesehatan Dasar (Riskedas). Moreover, Survei Status Gizi Indonesia (SSGI) reported that the stunting

prevalence in Indonesia was decreasing from 24.4% in 2021 to 21.6% in 2022. Some factors that can cause the stunting condition are gender and characteristics of the child, consumption of food or nutrient intake, absorption and utilization of mother and child, health status of mother and child such as chronic disease and recurrent infection, parenting style or psychosocial stimulation, breastfeeding, and health services such as immunization or others (Mugianti *et al.*, 2018). But, among of them, the fulfillment of nutrition or nutrition intake by the mother during pregnancy and breastfeeding also by the child itself is the main causative factor (Kurniati *et al.*, 2012).

The nutrient intake deficiency causes difficulty to reach optimal cognitive and physical development in children. Currently, noodles have been used as a second food after rice because of the modern lifestyle of society. Noodles are very popular among many people because their taste is good and easy to make. In addition, the price is also affordable and has a variety of flavors, so it can attract consumers from toddlers to adults easily. Healthy noodles that contains ingredients that have good nutrition can be used as an alternative solution for preventing stunting.

Noodles are generally made from wheat flour. It has been known that wheat products are disproportionally responsible for increases in obesity and diabetes (type 2), then gluten proteins of wheat can cause a range of adverse reactions, such as allergies, coeliac disease and other bad conditions (Shewry and Hey, 2016). Mocaf flour has characteristics that are good enough to substitute or replace 100% the uses of wheat flour in noodles product. Mocaf flour made of fermentation of cassava. Mocaf flour has characteristics that are almost similar to wheat flour except the elasticity level when used as a mixture for making noodles. It has been known that 100 g of mocaf flour contains energy nutrients (350 g), protein (1.2 g), Fe (15.8 mg), and zinc (0.6 mg) (TKPI, 2017). In addition, Krisno et al (2012), states that mocaf flour also contains beta-carotene (provitamin A which can be converted into vitamin A). Beta-carotene plays a key role as an antioxidant to counteract free radicals (Krisno and Vera, 2012).

Kenikir (*Cosmos Caudatus*) is one of the plants that are abundant in Indonesia. Kenikir contains Alkaloid compounds, saponins, steroids, phenols, terpenoids and flavonoids as an antioxidant (Aprilia *et al.*, 2020). Mediani et al (2012) reported that 100 g of fresh kenikir leaves contain about 2400 mg of ascorbic acid or vitamin C which is good for immunity. In fact, according to Amna et al (2013), kenikir leaves are widely used as traditional medicine for many purposes, such as as an appetite enhancing drug, can improve blood circulation, strengthen bones and also can used as anti-aging (Amna *et al.*, 2013).

Mung beans (*Vigna radiata*) have a high content of iron, protein as well as calcium and phosphorus (Nisa, 2016). According to Astawan (2009), it is stated that mung beans have substances needed for erythropoiesis or blood cells formation, and can conquer the effect of Hemoglobin (Hb) decrease because they contain zinc. Mung beans are also rich in nutritional content, 100 grams of it containing around 21.04 grams of protein, which is good for stunting prevention. Then, the yellow pumpkin (*Cucurbita moschata*) contains lots of carbohydrates, vitamins and fiber, vitamins (A and C), minerals (Ca, Fe and Na), also beta-carotene, so it can be used as additional ingredients to make this food innovation (Anam and Handayani, 2010).

Based on these backgrounds, we will make functional food innovations to prevent stunting that can be consumed by mothers and children (toddlers). This food innovation is healthy noodles namely “Mie Mocavita” which are made from Mocaf flour (cassava flour), *Cosmos caudatus* (Kenikir Leaves), *Vigna Radiata* (Mung beans), and *Cucurbita moschata* (Yellow Pumpkin).

METHOD AND EXPERIMENTAL DETAILS

This study used experimental methods and was conducted in April 2023 at the Integrated Laboratory of Islamic State University. The experiment consisted of three steps: the first step was MOCAVITA noodle formula designing, the second was MOCAVITA noodle production, and the last was organoleptic testing.

This research used 3 formulations with different comparisons of the main composition of (F2) used 150 grams of wheat flour and 150 grams of mocaf flour. The third formulation (F3) used 300 grams of wheat flour and does not use mocaf flour. The complete ingredients used for making the MOCAVITA's noodle showed in Table 1.

Table 1. MOCAVITA's Formula

No	Ingredients	F1	F 2	F3
1	Flour	225 gr	150 gr	300 gr
2	Mocaf flour	75 gr	150 gr	-
3	Green bean flour	15 gr	15 gr	15 gr
4	Pumpkin	15 gr	15 gr	15 gr
5	Kenikir leaves	3 tbsp	3 tbsp	3 tbsp
6	Egg	1 egg	1 egg	1 egg
7	Water	73 ml	73 ml	73 ml
8	Tapioca flour	5 gr	5 gr	5 gr

The equipment needed in this study includes large bowls/basins, spoons, scales, noodle molds, trays/pads, blenders and knives. Then the materials used are mocaf flour, mung bean flour, kenikir leaves and pumpkin and water. In this research, the noodle's-making procedure refers to Ramadhan's (2015) and Safriani's (2015) method with some modifications. All ingredients are mixed according to the designed formula in Table 1. The procedure for making noodles starts from 3 processes that are: 1) Materials preparation consists of mocaf flour and mung bean flour preparation, kenikir leaves extraction. pumpkin's steaming, 2) mixing all the ingredients to form a noodle dough then 3) making noodles from noodle dough using a noodle machine.

Kenikir Leaves Extraction

Kenikir leaves that have been selected for processing, are boiled first for 30 minutes then drained. After that, put enough kenikir leaves and boiled water in the blender, then blend until leaves become smooth (kenikir leaves extract).

Pumpkin Steaming Process

Processing of the pumpkin began with peeling the pumpkin, washing and chopping the pumpkin into small pieces then boiled for 30 minutes.. Then the pumpkin putting into a large bowl to be mashed using a spoon. Pumpkin ready to be mixed into the dough.

Noodle's Dough Making

Put all the ingredients into 3 bowls for each formula. Then put one egg into each bowl for each formula. Next, add the pumpkin that has been refined into the flour mixture according to the measure of each formula. After that, the kenikir leaves that have been blended are put into the bowl according to the measure. After all the ingredients are added, the mixture is stirred until it is evenly mixed. Then add water little by little while kneading until the noodle dough

is smooth. Then leave the dough for 15-30 minutes in a closed bowl. The dough that has been allowed to stand for 30 minutes is then taken little by little according to each formula to be mashed or molded using a noodle machine. Then, while making the noodles, heat the water until it boils and add the noodles to boil until they are cooked for about 2-3 minutes. The noodles are drained and ready to be served.

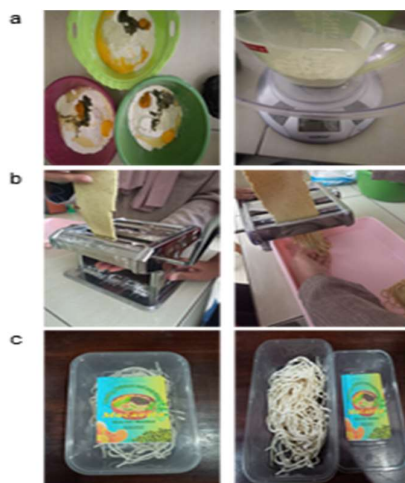


Figure 1: The process of making Mocavita Noodles; a) preparation of ingredients & dough making, b) Grinding the dough using a tool, c) Finished product packaging

The organoleptic test of 3 formulas of MOCAVITA noodles that has been made were also conducted in this study. The organoleptic test is to determine which one of the MOCAVITA formula that most liked by the panelists. The test involved 30 panelists consist of children and productive age's woman with range of the age between 7-45 years old. Organoleptic test is carried out by giving values from the numbers 1 to 5 for each criteria. Organoleptic test criterias are the colors, texture, taste, smells or aroma, and elasticity of the MOCAVITA noodles. Data of organoleptic test then analysed with Ms. Excel.

RESULTS AND DISCUSSION

Noodles are popular food among peoples ranging from children to adults. Currently, noodles have been used as a second food after rice because of the modern lifestyle of society. Mocavita is a healthy noodles made from mocaf flour (cassava flour), *Cosmos caudatus* (Kenikir), *Vigna Radiata* (Mung beans) and *Cucurbita moschata* (Yellow Pumpkin) to prevent stunting. Based on these ingredients, this noodle is appropriate with the fulfillment of nutrition in order to increase the stunting rate in Indonesia.

In this case mocaf flour is used because it contains beta-carotene, according to LIPI (2019), states that cassava as a local food ingredient has the potential to prevent stunting from an early age because it has a high beta-carotene content (LIPI, 2019). Kenikir contains ascorbic acid or vitamin C compounds which are useful for pregnant women in preventing iron deficiency or anemia which then prevents the baby from having iron deficiency also due to the impact of severe anemia suffered by the mother. Anemia can be caused by poor absorption of iron properly due to a lack of vitamin C. Children with anemia will be have risk of experiencing inhibition of growth and development, motoric disturbances and reduced school achievement.

According to the research has been conducted by Sekolah Tinggi Ilmu Kesehatan (2021), Pumpkin can support the growth and development of the fetus because it contains folate to prevent the fetus from imperfect development, also contains vitamins, antioxidants and minerals that are beneficial for the formation of organs of fetus, so that it has the potential to prevent stunting (STIKES, 2021). Another type of flour used is mung bean flour, this material is used because it contains high calcium, iron and phosphorus. The addition of mung beans flour is necessary because it can play a role in preventing anemia and maintenance bones (Nisa *et al.*, 2020).

MOCAVITA noodle was successfully made from all formulas as shown in Figure 1. The 3 kinds of mocavita had been made from this project has a variety of organoleptic test result that shown in Table 2.

Table 2. Organoleptic Test Result

Characterisitc	Formula					
	F1		F2		F3	
	Value	%	Value	%	Value	%
Taste	4	43,43%	4	40%	4	70%
Smell	4	40%	$\frac{3}{4}$	43,3%	3	46,7%
Texture	4	50%	4	50%	3	56,7
Elasticity	4	50%	4	40%	3	66,7%
Colour	4	50%	3	40%	4	50%
Average	4		3,6/3,8		3,4	

Value from 1-5 (1=Very Bad, 2=Bad, 3=Neutral, 4=Good, and 5=Very Good)

The participants of the organoleptic test were a productive woman and children from the age of 7 to 45 years old. The organoleptic test involved 30 participants or panelist: 5 panelists aged 7-15 years, 12 panelists 16-21 years and 13 panelists aged 21-45 years. Some of the organoleptic test process shown in Figure 2.

Every materials contained to make Mocavita noodles actually influence their characteristic. The characteristics of the noodles can affect the senses of each panelist which creates a variety of different results and opinions based on organoleptic test of the Mocavita noodles with 3 different formulas that have been made.



Figure 2. Organoleptic Test

1. Taste-Test

Based on data, characteristics taste of F1, the results obtained was 43.43%. Then in F2, it was found that 40% of the panelists liked the taste of the F2 noodles. While Found that 70% of panelists liked the taste of F3 noodles. The panelists equally gave the three formulas a score of 4. However they prefer F3 as the best taste because 70% of the panelist gave value 4.

2. Smells-Test

Based on the organoleptic test result of F1 that 40% of the panelists gave value 4 which is good. While for the aroma in F2, the data obtained had two results 43.3% of the panelists who gave value 3 which is neutral and also with the same percentage the panelists gave value 4 to F2 noodles. As much as 46.7% of panelists considered gave value 3 for F3 noodles. Differences in smell may occur due to the comparison of flour variations for each formula. Then the panelist might prefer the smell of F1 which having 75% of Flour and 25% Mocaf flour compositions. The more addition of mocaf flour will make the noodles have a more dominant cassava smell (Ramadhan and Sari, 2015).

3. Texture-Test

Based on the organoleptic test result of F1 that 50% of the panelists rated this noodle having a soft texture. Based on data from 50% of panelists, the texture of F2 noodles is more chewy/ little bit mushy. Then for the texture of the F3 noodles, 56.7% of the panelists gave value 3 that the F3 noodles had a fairly soft texture. So, the panelist might prefer the texture of F1 and F2 noodle.

4. Elasticity-Test

Based on the organoleptic test result of F1 that 50% of the panelist gave value 4 which means they agree that Mocavita noodles having a chewy elasticity like a normal noodles. About 40% gave value 4, its shows that panelists think that F2 has the elasticity of noodles that are springy. Then 66.7% of the panelists gave 3 value for F3 that this noodle had a level of elasticity that was quite chewy but not as chewy as F1 and F2 noodles.

5. Colours-Test

The color of the F1 noodles was yellow rated 50% and value 4 by the panelist. Meanwhile 40% of panelists think that F2 noodles have a pale yellow noodle color and gave value 3 which is neutral. F3 has a yellow noodle color rated 50% and value 4 by the panelists. This colours differences can be affected by the comparison of flour variations for each formula. The F2 may have a pale color because of its having 50% of mocaf flour compositions. Mocaf is known for its whiter colour. The greater amount of mocaf flour addition will cause the color of the noodles to turn pale (Ramadhan and Sari, 2015).

6. Aceptance-Test

The results obtained were that in F1, the majority of values were 4, which means that if explained one by one, each characteristic starts from the taste until the colours, the overall score results obtained were the highest among others formula.

Based on the characteristics, namely taste, aroma, texture, elasticity and color of each noodle formula, it is found that Formula 1 is a formula that is quite popular with the public. The difference from other formulas is that formula 1 uses 75% wheat flour 25% mocaf flour, 5% mung bean flour, so Mocavita Noodles in formula 1 is more popular because the texture is not easily brittle and the taste is quite chewy.

CONCLUSION

Based on the experiment, it can be concluded that the most preferred formulation by the panelists was the F1 formulation which contained 225 grams of wheat flour, 75 grams of mocaf flour, 15 grams of mung bean flour, 15 grams of pumpkin, 3 tablespoons of kenikir leaf extract. While the formulation that the panelists disliked the most was the 2nd formulation with the main composition of 150 grams of wheat flour and mocaf flour, 15 grams of mung bean flour, 15 grams of pumpkin, and 3 tablespoons of kenikir leaf extract. This product needs to be improved in order to improve organoleptic tests without reducing nutrition to prevent stunting.

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