

## Dough Development, Texture and Organoleptic of Steamed Bread Addition with Moringa Leaf Flour

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### ABSTRACT

Steamed breads are economic hawker that can be enjoyed by all people. Steamed bread fortified with moringa leaves will make relatively low nutritional products raised in nutritional standards. It produces products that are not only filling but also steamed buns are also highly nutritious. Moringa leaves contain many nutrients and benefits, and their use has not been maximized. This study aims to determine the aspects of texture, dough development capacity, and the level of organoleptic acceptance of steamed bread with the addition of moringa leaf flour. Texture testing is done using a penetrometer and getting P1 to be the softest product compare to others mixtures (P0, P2, P3) with an average value of 223 mm/50g/10s. Measurements of the dough expandability show that P1 can expand by 53.8%. Furthermore, in terms of organoleptic, P1 treatment is preferred by most (60%) panellists for the colour category. The addition of moringa leaf flour by 5% (P1) and 10% (P2) is preferred by 40% and 45% for the aroma category. In contrast for taste, 40% of panellists favour steamed bread without the addition of moringa leaf flour (P0). Then, the more addition of Moringa leaf flour, the less number of panellists who like it.

**Keywords:** Steamed bread; moringa leaf flour; moringa oleifera

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### INTRODUCTION

Steamed bread is a cheap snack that is often found in traditional markets. It is made from wheat flour and cooked by steaming. The affordable selling price makes this bread can be consumed by various groups, from the upper, middle, and lower classes. The manufacturing process is quite easy because it does not require a large variety of materials and uses relatively simple equipment. In general, this steamed bread is made from flour and other ingredients, such as sugar, chicken eggs, margarine, sp, and vanilla. Steamed buns ripened with two, which are baked in the oven and steamed. The success factor in the manufacturing process is in the process of mixing and steaming the dough. If the mixtures were shaken too long or too short, it could make the product become tight or fail. It will also happen if the steaming is not perfect (Andriani, 2012).

Steamed bread can be made more nutritious by adding some ingredients that have high nutrition, such as milk and chocolate, and topped with honey, cheese and so on. In this study, an experiment was carried out by adding Moringa leaf flour (Sofnitati, 2018).

*Moringa oleifera* is one of the extraordinary plants that has been found, where Moringa is scientifically a source of nutrition as well as medicinal properties. All parts of Moringa can be used and can grow in all types of climate, even the extreme environment. At present, its utilization in Indonesia is still lacking and limited. People usually only use Moringa leaves as a food supplement, not even a few that make it as an ornamental plant. Even in some areas, this is used more and more used to bathe the dead, shed amulets and animal feed. The main ingredient of steamed cake is wheat flour which is mixed or added with other ingredients, such as pandan leaves, cocoa powder. Through the addition of moringa leaf flour, it is expected to be able to add variants to the processing of Moringa plants and add flavour to the steamed buns (Permatasari, 2018).

The process of making Moringa leaf flour in this study began with washing to remove dust and residual dirt on the leaves. It is followed by the process of drying or

removing the water content in the leaves of Moringa by using indirect sunlight (aerated). After that, the dried moringa leaves are crushed using a blender and sieved using approximately 80 mesh sieves to get the flour.

This study aims to determine changes in texture, dough development capacity and the level of consumer preferences on steamed buns with the addition of moringa leaf flour. The benefits of this research are to add insight into the use of Moringa leaves as a food additive, such as fortification in steamed buns and to add a variety of flavour.

## METHODS

In June-July 2019, the research was carried out at the Agroindustry Study Program Laboratory, Faculty of Vocational University August 17, 1945, Surabaya. The formulation for adding Moringa leaf flour in the production of steamed buns is presented in Table 1:

Table 1: Steamed Bread Formulation

Treatment/ Product	Egg (g)	Sp (g)	Sugar (g)	Margarine (g)	Vanilla (g)	Wheat Flour (g)	Moringa Leaves Flour (g)
P0	230	5	220	100	2	150	0%
P1	230	5	220	100	2	150	5% (7,5)
P2	230	5	220	100	2	150	10%(15)
P3	220	5	220	100	2	150	15%(22,5)

### *Texture analysis with a Penetrometer*

The texture of a material is a quality element that can be sensory measured by the touch of a fingertip, using the tongue, mouth and teeth. It can also be measured objectively with special tools, such as tenderometer, textureometer, succulometer, perossurometer and penetrometer. The penetrometer is a device used to measure the level of hardness or texture of a material with the principle of measuring the depth of the inserting awl.

### *Ability to develop/enlarge the dough*

Measurement of the dough development capacity is done by measuring the volume of the bread dough before (a) and after the final proofing (b) The degree of dough development can be calculated by the formula:

$$\text{Degree of dough development/enlargement} = \frac{a-b}{a} \times 100$$

Where: a = the volume of bread after steaming  
b = the volume of bread before steaming

### *Organoleptic test*

The parameters observed or tested through organoleptic tests are colour, aroma, and taste in steamed buns. The test was carried out using a preference test and panellists used for this study using 20 panellists trained panellists with the following value categories:

1 = highly dislike, 2 = dislike, 3 = neutral, 4 = like, 5 = highly like

Organoleptic test parameters include:

Colour is an essential aspect of the quality of a food product. Colour quality shows the quality of taste and texture of food so that the public can accept it. The colour indicates that there has been a chemical reaction in food. According to (Utami, Wahyuni, &

Muzuni, 2016), It is essential in the reception of food. The aroma is one of the factors that determine the delicacy of food ingredients. The taste of food actually consists of three components, namely the smell, taste and stimulation of the mouth. The odour produced from food determines the delicacy of these foods. It has more to do with the sense of smell. According to (Destrasia, 2012), testing of aromas in the food industry is considered vital because it can quickly provide an assessment of the product will be accepted or not by consumers. Taste arises due to chemical stimuli that can be accepted by the taste buds or the tongue. Taste is a factor that influences the acceptance of food products. If the aroma, colour and texture components are good, but the consumer does not like the taste, then the consumer will not accept the food product (Sari, 2019). According to (DeMan, 1997), there are only four basic tastes that are preferred, namely sweet, bitter, sour and salty. Taste sensitivity is found in the taste buds on the tongue.

## RESULT AND DISCUSSIONS

### *Texture with Penetrometer*

Table 2 shows where the tenderness of steamed buns decreases in line with the addition of moringa leaf flour. The hardness value is a description of a product's resistance to pressure from the product being tested (Pratama, Rostini, & Liviawaty, 2014).

Table 2. Results of texture measurements with a penetrometer in mm/50g/10s units

Treatment	Point 1	Point 2	Point 3	Average
P0(0%)	225	260	265	250
P1 (5%)	225	223	223	223
P2 (10%)	218	222	184	208
P3 (15%)	129	189	209	175

The hardness value of steamed bread shows the depth of the needle that was stuck into the bread. The deeper the stitch, the more soft the bread is. The hardness value of steamed buns is presented in Table 4. The test results show that the fortification of 5% Moringa leaf flour influences the texture of steamed buns. The lowest hardness value was recorded in steamed buns with the addition of 15% Moringa leaf flour (P3). It is possible because the addition of moringa leaf flour causes the water content of the dough to be absorbed. Wheat added with moringa leaf flour produces a thick mixture (Dachana, Rajiv, Indrani, & Prakash, 2010). High food fibre content can also increase violence. The higher the moringa leaf flour used, the harder or denser the texture of the product (Rahmawati, 2016). Changes in texture caused by loss of fluid, reduced fat, formation or breakdown of emulsions, hydrolysis or carbohydrate polymerization, and hydrolysis or protein coagulation (Fitri Kusuma Dewi, Neneng Suliasih, 2010).

### *Ability to develop/enlarge the dough*

Bread development is measured by using the difference in the volume of bread when it becomes a dough and the volume of bread after it becomes chunks of bread. Steamed buns owned the most significant volume development with the first treatment, which did not use moringa leaf flour at 64.7%, and the second treatment follows it at 53.8%. More and more Moringa flour is added will decrease the level of development of steamed buns.

Table 3. Dough development measurement results

Treatment	Initial Volume (a)	Final Volume (b)	$\frac{b-a}{b}$	Percentage (%)
P0	561	1589,5	0,647	64,7
P1	561	1215	0,538	53,8
P2	561	1028,5	0,454	45,4
P3	561	935	0,4	40

The process of developing bread can be influenced by several things, namely the raw material, the process of forming the dough and the length of time of fermentation. The use of wheat flour as a raw material in making bread can produce a right level of development and as an indicator of the quality of bread. It is caused by the gluten content in the flour needed in making bread to produce proper development in the dough (Ligo, Harnalke, Jenny Kandou, 2016). Growth ability is also influenced by the amount of water bound by the dough (Pusuma, Praptiningsih, & Choiron, 2018).

*Organoleptic test*  
*Colour*

Organoleptic assessment of the colour of steamed buns by the addition of moringa leaf flour showed that colour greatly influenced the acceptance of steamed buns. From the results of the organoleptic assessment in Table 5, it can be seen that the highest evaluation of colour characteristics is found in formula P1.

Table 4. Colour organoleptic test results on fortified moringa leaf fortified steamed buns

	P0	P1	P2	P3
Highly dislike	0%	5%	0%	10%
Dislike	0%	10%	10%	40%
Neutral	10%	10%	35%	40%
Like	45%	60%	55%	10%
Highly like	45%	15%	0%	0%

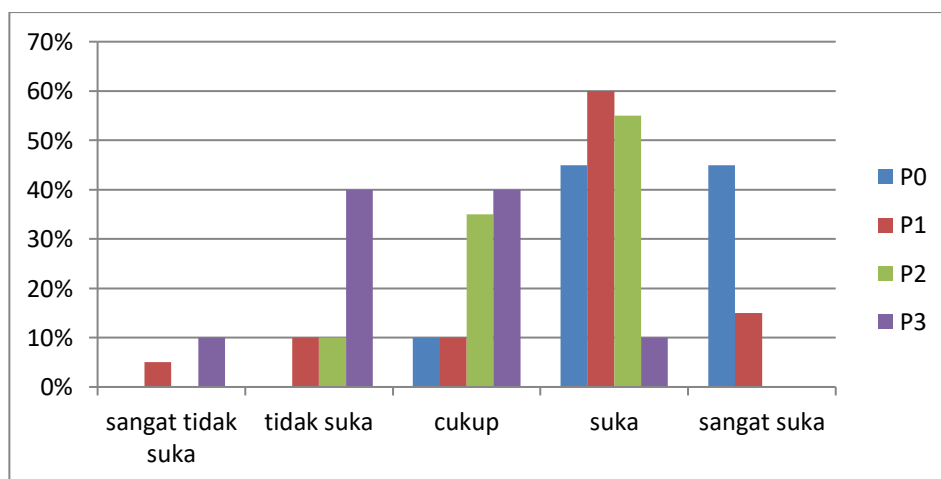


Figure 1. Histogram of organoleptic test results on colour

The percentage of preference for colour is 60%, which is included in the liking category. Moringa steamed buns have a light green and bright colour, in contrast to steamed buns control (P0) which has a bone white colour. As the addition of Moringa leaf powder, the resulting green colour becomes darker and less attractive. It makes a decrease in the

acceptance of steamed buns on the panellists. According to (Winarno, 2006), colour is the first stimulus to the eye senses that affects food reception.

### Aroma

The aroma of food determines the delicacy of the food. Consumers will more readily accept a food product if it has a distinctive and attractive aroma (Winarno, 2006). The organoleptic assessment of the steamed buns aroma showed that in terms of smell, the P0 treatment was particularly preferred by 45% of panellists. For P2, 45% of panellists said they liked, and 5% said they highly liked.

Table 5. Organoleptic aroma test results on fortified Moringa leaf flour steamed buns

	P0	P1	P2	P3
Highly dislike	0%	5%	0%	10%
Dislike	5%	10%	30%	40%
Neutral	20%	20%	20%	40%
Like	30%	40%	45%	10%
Highly like	45%	25%	5%	0%

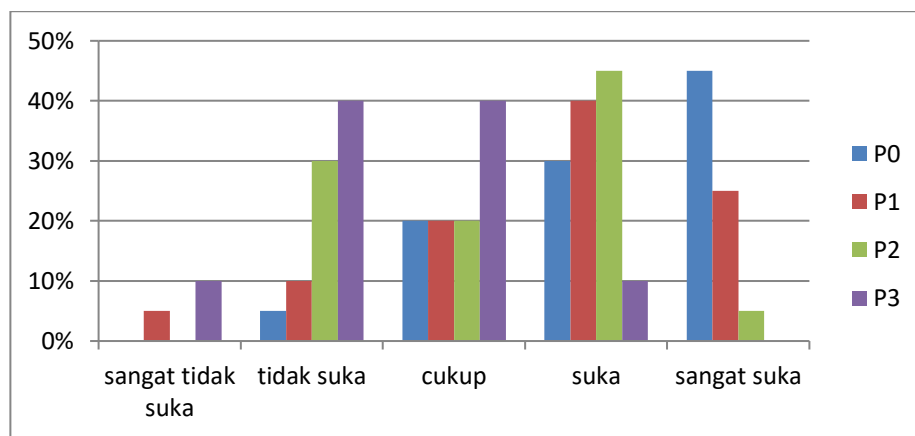


Figure 2. Histogram of an organoleptic aroma test

The higher the percentage of the addition of Moringa leaf flour, the rate of panellist dislike increases. It is because steamed buns at 5% Moringa flour concentration has a slightly unpleasant aroma. The decrease in the preference level for the smell of steamed buns is due to the dominant (Permatasari, 2018) odour of the moringa leaves. Moringa leaf flour has an overpowering scent of fragrance (Permatasari, 2018) so that at a concentration of 15% moringa flour the smell of steamed bread aromas is powerful compared to the concentration of 5% and 10%. The emergence of aroma or odour due to the presence of odour substances that are volatile (volatile). The protein contained in the material will be degraded into amino acids by the presence of heat. The reaction between amino acids and sugar will produce an aroma. At the same time, the fat in the material will be oxidized and broken down by heat so that some of the active ingredients caused by the breakdown will react with amino acids and peptides to produce the aroma (Mutiar, Adikahriani, & Wahidah, 2012). The smell (aroma) of many foods determines the delicacy of these food ingredients. In terms of smell, it has more to do with the inhaler senses. New odours can be recognized when steam is formed, and the odour component molecules must have time to touch the olfactory cell cilia and be transmitted to the brain in the form of electrical impulses by the ends of the olfactory nerve (Rahardjo, Widiada, & Sofiyatin, 2017).

### Taste

Organoleptic test results showed that steamed bread without the addition of Moringa leaf flour (P0) was the most preferred by 50% panelists.

Table 6. Organoleptic taste test results on steamed buns

	P0	P1	P2	P3
Highly dislike	0%	0	5%	25%
Dislike	0%	10%	35%	40%
Neutral	10%	35%	25%	30%
Like	50%	40%	30%	5%
Highly like	40%	15%	5%	0%

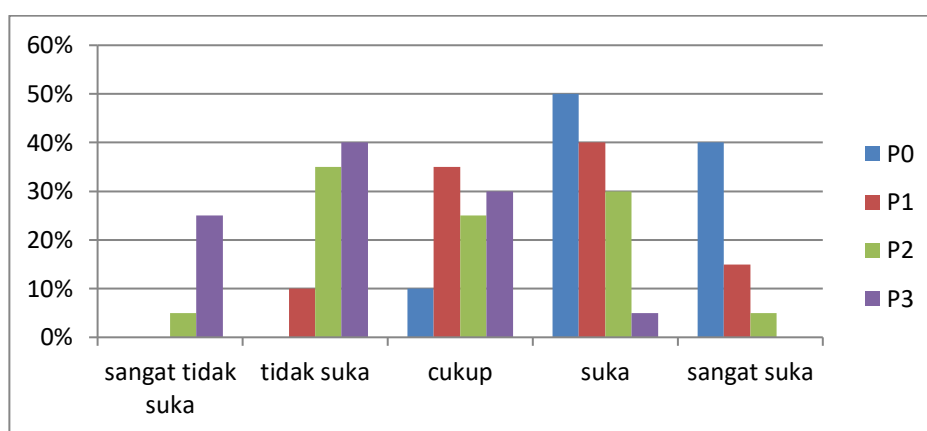


Figure 3 Diagram of organoleptic taste tests

For steamed bread with the addition of Moringa leaf flour, it shows that the greater the percentage of Moringa leaf flour added, the percentage of panelists who like steamed bread decreases ie P1 40%, P2 30%, P3 5% This is due to the bitter taste in the leaves Moringa which can affect the taste of steamed buns. The more moringa leaf flour is used, the more bitter steamed bread taste (Rahmawati, 2016)

### CONCLUSION

The addition of moringa leaf flour gives an effect on the texture of steamed bread products, ie the more addition of moringa leaf flour will reduce the tenderness of the steamed bread product. For taste, the addition of Moringa leaf flour by 5% and 10% is still preferred by panellists while for the addition of 15% it is already disliked by consumers. In the aspect of aroma, the unpleasant odour of Moringa leaves is felt at an additional 15% so that panellists do not like the product. In the aspect of colour, an addition of 5% and 10% produce colours that are still preferred by consumers, while the addition of 15% provides colours that are not preferred by consumers.

### RECOMMENDATION

During the process of mixing egg yolks with sugar, the mixture should be tried to expand to a maximum of 10-15 minutes. After all the mixture is mixed, it should be immediately put into a baking pan and steamed so that the steamed bread is not tight. It must be monitored the condition of the water in the steamer so it does not run out and cause scorching.

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