MAKING OF VEGETABLE FLOUR FOR BREAD PRODUCTS

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ABSTRACT

Abstract, Background. Indonesia is becoming an emergency for consumption of vegetables and fruit. Every year the consumption of vegetables continues to decline. Efforts are needed to vary the shape of vegetables in order to increase vegetable intake. One of the aims of this research is to make the right balance for a bakery product. The method used is experimental. The balance between cassava flour and Moringa leaves is 75%:25%, 50%:50%, and 25%:75%. The result turns out that this balance can be used as a mixture for making bread. In terms of color, it turns out that Formula 3 is preferred, namely 25% cassava flour and 75% Moringa leaves. These results should be developed for trials of other products such as martabak. Other organoleptic tests should be added for better overall results.

Keyword : cassava flour, Moringa leaves, bread

INTRODUCTION

The results of Basic Health Research (Riskesdas) in 2007 showed that the proportion of causes of death in Indonesia due to DM in the age group 45-54 years in urban areas was ranked second, namely 14.7% [5]. One of the factors for diabetes is low consumption of vegetables [1]. Es Ford's research shows that consuming

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vegetables less than 5 times a day will develop diabetes [6].

The 2014 Indonesian Food Consumption Survey (SKMI), as many as 97.1% of Indonesia's population consumed less vegetables. The highest age group that consumes less vegetables and fruit is the adolescent age group (98.4%). Likewise the adult group (96.9%) and the elderly (97.2%) [7]. Indonesian people's fruit and vegetable consumption refers to 2016 BPS data reaching 173 grams per day and the World Health Organization (WHO) recommends at least 400 g of fruit and vegetables every day[8]. Diabetic sufferers have high extracellular glucose levels which will increase the production of ROS (Reactive Oxygen Species) DM causing increased levels of free radicals which can damage cell membranes into lipid peroxide or Malondialdehyde (MDA).

This study aims to improve the quality and competence of researchers in conducting research. The aim of the research is to be able to make cassava leaf and Moringa leaf vegetable flour products, which are preferred by many to conduct trials on making products for the manufacture of Moringa leaf and cassava leaf vegetable flour using the Freeze drying method, organoleptic testing and complete nutritional analysis. Examination of the nutritional content of Vegetable Flour is B Carotene, Vit C, Fe, Protein, Moisture, Ash, Fiber and Antioxidant.

METHOD

The method used was experimental using various balances , namely 75%:25%, 50%:50%, and 25%:75%. for making bread.

The process of making Moringa flour and Cassava leaves

(a), prepare the cleaned Moringa leaves and cassava leaves

(b), cut the Moringa leaves into thin pieces

(c), put the Moringa leaves and cassava leaves into a blender and blend for ±15 minutes until smooth

(d), put the Cassava Daung and Kelor Daung into the Freeze Drying tool with a temperature of – 85^{o}C with a pressure of 0.0023 BAR for 97 hours

(f), the Daung Kelor and Daung Cassava flour are filtered then they are ready to use and filtered 100 mesh .

RESULTS

The shelf life of Cassava Leaf Flour and Vegetable Moringa Leaves can be extended by processing them into vegetable flour. Processing of vegetable flour can be done using various technologies either by heating or at low temperatures. In the form of flour, besides being easier in the process of distribution and trade, vegetable flour is also a very flexible intermediate product to be processed into a variety of food products that are popular with the public, such as bread, martabak, etc.

Generally, flour is made by heating either through an oven or drying it in the sun. The heating method will cause a decrease in nutrients or damage to nutrients. The newest method is using the Freeze-Drying method or drying at a very low temperature (-85^{o}C) and with a pressure of 0.0023 BAR for 97 hours. The implementation of making flour was carried out at the BATAN Bandung Laboratory. Fresh vegetables must be blended and placed in a plastic box. The plastic box is placed in the Freeze-Drying tool as shown in the following

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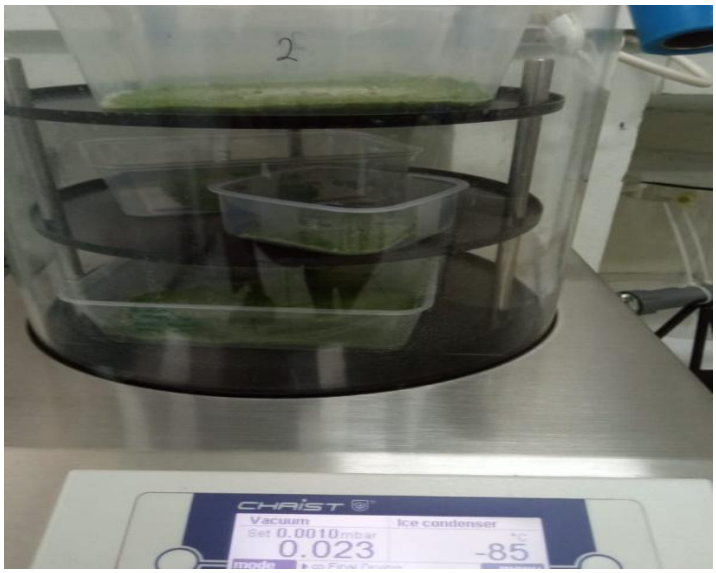

Figure 1. Freeze Drying Process of Cassava Vegetables and Moringa Leaves.

Examination of the analysis of nutrients and antioxidants has not been carried out considering that they have not received samples. There were other laboratories that received but only part of the examination because there was damage to the equipment. Examination of nutrition was postponed because if they were separated, they were worried that they would produce different results.

Preliminary research is carried out before the implementation of the main research. The ingredients used to add bread and martabak products are cassava leaf flour and Moringa leaves. Balance between cassava flour and moringa flour, namely 75%:25%, 50%:50%, and 25%:75%. The ingredients and the amount of materials needed for the product are listed in the table 1.

TABLE 1
BREAD MAKING INGREDIENTS

No.	Ingredients	Formula		
		1 (75%:25%)	Formula 2 (50%:50%)	Formula 3 (25%:75%)
1.	Cassava leaf flour	42 gr	28 gr	14 gr
2.	Moringa leaf flour	14 gr	28 gr	52 gr
3.	Wheat flour	250 gr	250 gr	250 gr
4.	Yeast	8 gr	8 gr	8 gr
5.	Softener	5 gr	5 gr	5 gr
6.	Sugar	100 gr	100 gr	100 gr
7.	Butter	50 gr	50 gr	50 gr
8.	Egg	50 gr	50 gr	50 gr

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No.	Ingredients	Formula		
		1 (75%:25%)	Formula 2 (50%:50%)	Formula 3 (25%:75%)
9.	Powdered milk	100 gr	100 gr	100 gr
10.	Water	150 ml	150 ml	150 ml

The difference in ingredients in each formula is the amount of cassava leaf flour and Moringa leaf powder which is adjusted to a predetermined balance, while the ingredients for and the amount of other ingredients is the same in each formula. The results of making bread and martabak products can be seen in the figure 2.

F1 (75%:25%)

F2 (50%:50%)

F3 (25%:75%)

FIGURE 2

FIGURE RESULTS OF BREAD PRODUCTS

The yield of bread is calculated based on the final weight of the bread compared to the initial weight, with the results in the form of percentages which can be seen in the following calculation results:

$$\textit{Yield of bread F1} = \frac{Final}{weight\ Initial\ weight}\ x\ 100\%$$

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$$\frac{696\ grams}{769\ grams}\ x\ 100\% = 90.5\%$$

Yield of bread F2 = $\frac{Final}{weight\ Initial\ weight}\ x\ 100\%$

$$\frac{754\ gram}{769\ gram}\ x\ 100\% = 98\%$$

Yield of bread F3 = $\frac{Final}{weight\ Initial\ weight}\ x\ 100\%$

$$\frac{729\ grams}{769\ grams}\ x\ 100\% = 94.7\%$$

TABLE 2

BREAD RENDEMENT

Formula	yield
F1	90.5%
F2	98%
F3	94.7%

Based on the calculation results, the highest yield of bread is F2 of 98 %, while the lowest yield was F1 of 90.5%.

Bread

Hedonic Test Result on Bread Color Aspect

Organoleptic test through hedonic test was conducted to 30 semi-trained panelists. The characteristic description based on the average value of the color aspects of the three formulas can be observed in the table below:

TABLE 3

AVERAGE VALUE OF HEDONIC TEST SCORES ON COLOR ASPECTS IN BREAD PRODUCTS

Parameters	Formula		
	F1	F2	F3
Color	4.03	4.40	4.63

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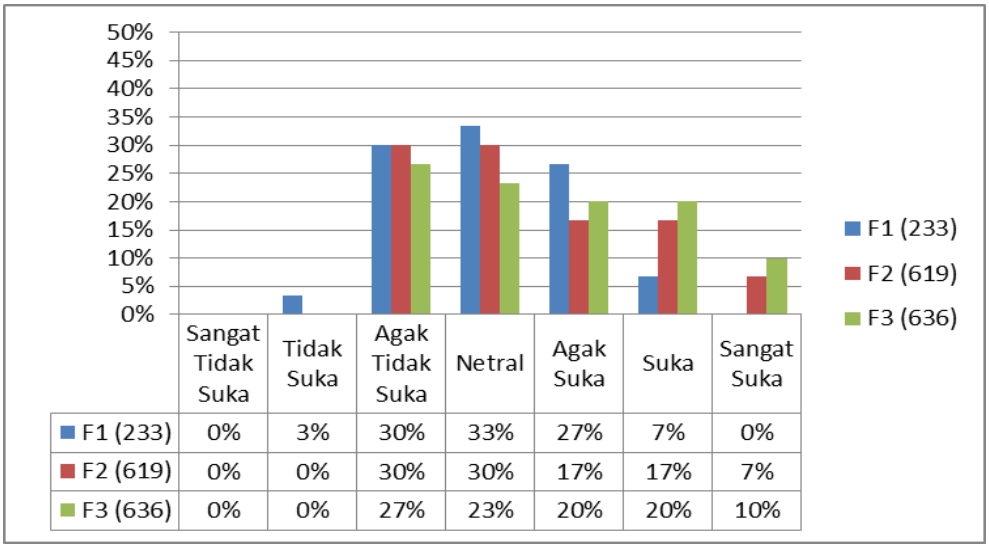
Based on Table 3, it can be observed that the highest average color aspect value is obtained in F3 (4.63) and the lowest is in F1 (4.03). The distribution of hedonic test results on the color aspect can be seen in the image below.



	Sangat Tidak Suka	Tidak Suka	Agak Tidak Suka	Netral	Agak Suka	Suka	Sangat Suka
F1 (233)	0%	3%	30%	33%	27%	7%	0%
F2 (619)	0%	0%	30%	30%	17%	17%	7%
F3 (636)	0%	0%	27%	23%	20%	20%	10%

FIGURE 3
PERCENTAGE OF PANELIST ASSESSMENT OF THE COLOR OF BREAD PRODUCTS

Based on Figure 3, it can be observed that in the color aspect assessment of F1 panelists, the highest percentage was neutral with 33% while the lowest was disliking with 3%. Furthermore, for F2 the highest percentage of the panelists judged somewhat disliking and neutral with each 30% and the lowest was very like with a percentage of 7%. Meanwhile, in F3 the highest score was in the assessment of the slightly disliked aspect of 27% and the lowest was very like with a percentage of 10%. Thus, the most preferred formula based on the results of the hedonic test was F3 by 30% of the panelists who said they liked and really liked it.

The results of statistical tests using *Kruskal Wallis* found that p (0.268) > α (0.05), so it can be concluded that there is no significant difference between the three formulas. Therefore, the *Mann Whitney*.

Conclusion

Vegetable flour from Moringa leaves and cassava leaves can be made into flour. This flour can be used in various products, one of which is bread. In terms of color, Formula 3 is the most acceptable for bakery products with a balance of 25% cassava flour and 75% moringa leaf powder. It can also be made for other products such as martabak. With a variety of products produced, the value of vegetables will be more beneficial for health.

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