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ORGANOLEPTIC CHARACTERISTIC OF BROWNIES FROM MOCAF AND GREEN BEAN FLOUR

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ABSTRACT

The development of local food is one of the programs being promoted by the ministry of agriculture and as an effort to diversify food in the midst of the Covid-19 Pandemic. One of the local food commodities developed was cassava. Based on data from the Central Statistics Agency related to cassava productivity in Indonesia (2014 – 2018) it was in the range of 229.51 – 246.50 tons/year. the average percentage of flour consumption per capita from 2014 –2018 is 19.92%. In addition, the cassava industry had also begun to develop, namely the processing of cassava into Modified Cassava Flour (Mocaf). Organoleptically, the value of Mocaf (in terms of aroma and taste) was almost equivalent to wheat. (Nesia, 2009). One way to control the value of imported flour is by developing products based on local food ingredients. Based on this, local food preparations based on modified cassava flour were developed, namely mocaf and fortified green bean flour as a source of protein. Processed products from cassava and green bean are able to substitute the use of flour 10-100%. This study aims to determine the effect of MOCAF formulation and green bean flour on the organoleptic characteristics of brownies. The flour formulations used for the four treatments (MOCAF wheat flour and green bean flour) were based on the ratio of the composition of each flour. Furthermore, observations were made on the organoleptic characteristics of roasted brownies consisting of color, scent, texture, taste and after taste. Organoleptic test involved 30 untrained panelists using the hedonic method. Organoleptic test results illustrate that the overall product is acceptable, both in terms of taste, aroma, color, texture and after taste. In treatment A, which is brownies with a composition ratio of flour, mocaf and green bean flour (1:3:0), the panelists are generally preferable. In Treatment C, brownies with a composition ratio of flour, mocaf and green bean flour (1:2.33:0.75) only tasted better by the panelists. This indicates that the panelists prefer the addition of green bean flour less than mocaf.

Keywords: Mocaf, green bean flour, organoleptic, brownies

INTRODUCTION

In Indonesia, the average consumption of wheat flour per capita from 2014 –2018 was 19.92%. Every year there is an increase in consumption of about 200 kg (Komalasari, 2018). This causes the import value of wheat and wheat to be high and drains the country's foreign exchange (Ariani 2010). Most of the import demand is derived from the form of noodles, bread, and biscuits. One way to control the value of wheat imports is to develop products based on local food ingredients. Groups of local foodstuffs developed are tubers and seeds such as cassava, sweet potato, corn, green beans (Ratnawati, 2001). Cassava production in Indonesia is 246.50 tons/year (BPS, 2018). green bean production is 234,720 tons with

consumption needs of 304,000 tons per year (Pusdatin, 2018).

Based on this, local food preparations based on modified cassava flour were developed, namely Modified Cassava Flour (MOCAF) and fortified green bean flour as a protein source. Processed products from cassava and green beans are able to substitute the use of 10-100% wheat both in fresh and intermediate products (flour). The addition of various types of flour in addition to improving the rheological properties of flour can also increase the nutritional value of the resulting product (Mohankumar, 2009). In addition to realizing the concept of food diversification, it also creates public awareness of healthy food and the development of agro-industry made from local raw materials (Ginting, 2011).

Mocaf is an intermediate product (flour) of cassava which is processed with the principle of fermentation using LAB (Lactic Acid Bacteria). This process produces pectinolytic and cellulolytic enzymes as well as lactic acid, so that the characteristics of the final product are similar to wheat flour. In addition, MOCAF does not contain gluten, so it is safe to consume for people with autism (Subagio, 2010). The texture of the mocaf is smooth, the color is whiter, and it doesn't smell musty like cassava flour in general. The source of cassava used can also affect the characteristics of mocaf, such as the Genotype Butter 2 which has a more yellow color characteristic (the presence of beta carotene content is around 52 mg/kg) than mango (Fathonia, 2016).

Green bean (*Vigna radiata* L.) contains good carbohydrates, protein and fiber (Kenawi, 2009). The protein content in green beans is 22.9% and has a digestibility of 81%. Green bean protein is rich in the amino acid lysine but contains a small amount of sulfur amino acids (methionine and cystine) (Astanto, 2006). The use of green beans in processed foods can increase the nutritional value and taste.

One of the processed food products made from flour is brownies. Making brownies can also take advantage of local food ingredients. Brownies are an intermediate moisture food (IMF) product group with a moisture content of 10-20% (Cauvain, 2006). The consumption pattern of cake/bakery that is very popular with the people of Bandung is brownies. Brownies can be processed by baking or steaming (Sumarwan, 2011). In general, the difference in processing lies in the water content. Baked brownies have a lower water content than steamed brownies, so they have a longer shelf life. Baked brownies are more savory in terms of taste, while steamed brownies are safer and healthier because free radicals are not formed due to the roasting process (Saragih, 2011).

A touch of technological innovation is needed in an effort to reduce imports of flour, diversify food and utilize local food. One of them is making brownies made from local food, namely the substitution of mocaf and green bean flour. Furthermore, this product is subjected to a sensory test, which is a test method using the human senses to measure texture, appearance, aroma, and taste. Organoleptic test aims to determine consumer acceptance or preference for a product (Setyaningsih, 2010). The purpose of this study was to determine the organoleptic properties of brownies from mocaf and green bean flour.

MATERIALS AND METHODS

This research has been carried out at the Food Engineering and Processing Laboratory, Food Technology Study Program, Sultan Ageng Tirtayasa University.

Materials and Tools

The materials used for made brownies were flour, sugar, egg, margarine, cocoa

powder, chocolate bar, milk powder, salt, baking soda and SP. While type of flour used are whea, MOCAF and green bean flour. Other materials used The tools used in this research include tools for made brownies were oven, mixer, scale, baking sheet, measuring spoon, bowl, measuring cup, and others. Procedures and formulations for made brownies refer to Setiawati's research (2015). The treatment formulation in this research consisted of four formulations. Formulations are presented in Table 1.

Table 1. Research Treatment Formulation

Treatment	Flour formulation per 300 grams		
	wheat flour	mocaf	green bean flour
A	75	225	0
B	75	200	25
C	75	175	50
D	75	250	75

Methods

The stages of the research have been carried out in two stages, namely the stages of made brownies and organoleptic test. Organoleptic test was carried out by the hedonic test method. This method was the most widely used test to measure the level of preference for the product. The method was designed to directly select one product among other products. Organoleptic parameter includes changes that occur in color, aroma, texture, ta ste and after taste (Setyaningsih, 2010). This test was carried out by 30 panelists from students of the Sultan Agung Tirtayasa University. The scale used is a number from 1 to 5, where 1 = very dislike, 2 = dislike, 3 = netral, 4 = like, 5 = very like. The data has been processed using Microsoft Excel 2010. Sensory test results data were analyzed descriptively using the average value and the percentage of panelists' acceptance of the brownies formula.

RESULTS AND DISCUSSION

Organoleptic Test

Organoleptic tests use the hedonic method to explain the characteristics of the preferred product and describe the expected product characteristics (Nurmalasari, 2019). The research data illustrates that the product as a whole can be accepted, both in terms of taste, aroma, color, texture and after taste. In treatment A, namely brownies with a composition ratio of flour, mocaf and green bean flour (1:3:0) the panelists generally preferred. It's just that the average value in terms of taste is not liked but can be tolerated in terms of after taste. Treatment formulation A used MOCAF without green bean flour so that it produced a neutral taste like wheat flour or brownies in general. In Treatment C, brownies with a ratio of flour, mocaf and green bean flour (1:2.33:0.75) were only preferred by the panelists in taste. This shows that the panelists prefer the addition of green bean flour less than mocaf. The formulation of green bean flour that does not dominate, makes the brownie taste soft with the characteristic of green bean. In addition, if the composition of mung bean flour is added more then the level of preference for brownie texture decreases. The graph of the hedonic quality test of mocaf brownies and green bean flour is presented in Figure 1.

Color is the main component in determining the level of consumer acceptance of the overall product (Winarno, 2004). Color affects the assessment of the characteristics and quality of a food (Setyaningsih, 2010). Brownies color is usually influenced by the ingredients and the roasting process. The level of color produced in this study is more influenced by differences in the amount of use of green bean flour. The dark brown color which was less glossy in treatment C was not liked by the panelists. The average range of preference values for color is between 2.63 – 3.43 which is included in the neutral category

and tends to like. The average preference value for color brownies can be seen in Table 2.

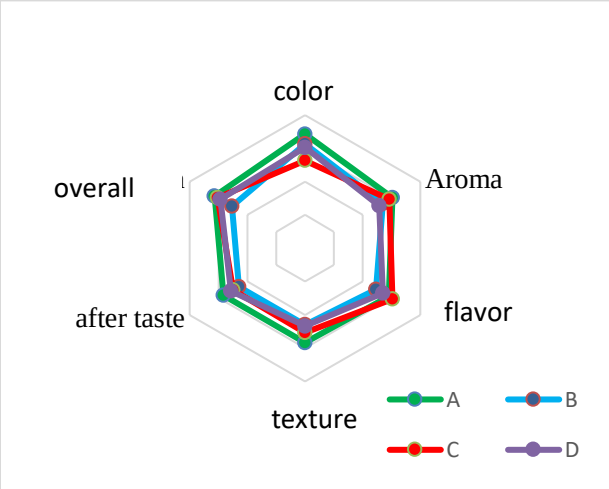

Figure 1. Graph of hedonic quality test of brownies from mocaf and green bean flour

Table 2. Average score of panelists' preference for brownies form mocaf and green bean flour

Treatment	Average score of panelists' preference for brownies					
	Color	aroma	Flavor	texture	*After Taste*	overall
A	**3.43**	**3.03**	2.9	**2.83**	**2.93**	**3.13**
B	3.13	2.7	2.47	2.3	2.3	2.53
C	2.63	2.93	**3.03**	2.53	2.5	3.03
D	3.03	2.57	2.7	2.33	2.57	2.93

Scale: 1 = very dislike, 2 = dislike, 3 = netral, 4 = like, 5 = very like

Aroma brownies has an average range of preference values between 2.57 – 3.03 including in the slightly neutral category. The strong and unpleasant aroma of green beans in treatment D was not liked by the panelists. Assessment of the characteristics of the scent is identical to the aroma of volatile compounds or certain products known (Setyaningsih, 2010). Panelists who are accustomed to consuming green bean will prefer the distinctive aroma of green bean flour. The average preference value for scent brownies can be seen in Table 2.

Taste is the most important factor in the final decision of the panelists to accept or reject a food (Kusumaningrum, 2016). Determination of food taste is influenced by the product formulation (Fellows 2000). The average range of preference values for the flavor brownies is 2.47 – 3.03 including in the slightly neutral category. The average value of preference for brownies can be seen in Table 2. From the average value for taste, it can be seen that the brownie formulation with the addition of green bean flour affected the panelists' preferences.

The texture of the brownies preferred by the panelists in this study was soft, sturdy and not easy to melt in the mouth. Texture in bakery products is a critical parameter in appearance, taste and overall acceptance (Setser, 1995). The average preference value for texture brownies can be seen in Table 2. The average range of preference values for brownies texture is 2.30 – 2.83 including in the less like category. The amount of flour used greatly affects the texture of baked brownies. The more the amount of flour, the stronger the texture of the brownies produced (Setyani, 2017). In addition, if the amount of green bean flour is increased, the level of preference for brownies texture will decrease. Green bean juice dregs affect the resulting texture because of the rough after taste in the esophagus. The maximum limit for panelists' acceptance of the addition of mung bean juice is 50% of the total use of mocaf and wheat flour (Kusumaningrum, 2016).

After taste is a stimulant substance that gives the impression that it is easy or not easy to lose after a product is finished being consumed (Widiantoko, 2014). The average range of preference values for after taste brownies is 2.30 – 2.93 including in the category of dislike close to neutral. The addition of green bean flour in the treatment showed an effect on the after taste of the

addition of green bean flour in each treatment.

CONCLUSION

In terms of overall, the panelists preferred treatment A brownies, while in terms of taste, panelists preferred treatment C. This shows that the panelists prefer the addition of green bean flour less than mocaf. This value indicates that the brownie product in this study can be accepted by consumers with a neutral and good preference score.

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