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The effect of additional flour of bean sprouts on organoleptic quality and nutritional content of semprong cake

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ABSTRAK

Latar belakang: *Nilai zat gizi makro yang terdapat pada kecambah kacang hijau pada usia kecambah 24 jam yaitu protein 30,47%, lemak 0,44%, karbohidrat 65,97%. Kecambah atau toge zat gizinya lebih mudah diserap tubuh.*

Tujuan: *Untuk menganalisis mutu organoleptik kue semprong yang ditambahkan tepung kecambah kacang hijau dan kandungan gizinya.*

Metode: *Penelitian ini bersifat eksperimen dengan menggunakan Rancangan Acak Lengkap (RAL) dengan perlakuan A (100% tepung beras), B (100 % tepung beras dan 10 % tepung kecambah), C (100 % tepung beras dan 20 % tepung kecambah), D (100 % tepung beras dan 30 % tepung kecambah). Dilakukan pengulangan sebanyak dua kali. Untuk mengetahui pengaruh perlakuan dilakukan uji organoleptik pada warna, aroma, tekstur dan rasa kue. Analisis yang dilakukan sidik ragam (ANOVA)dan bila F hitung besar dari F tabel dilanjutkan dengan uji Duncan New Multiple Test (DNMRT). Analisis kandungan gizi dilakukan di laboratorium balai riset dan standardisasi industri kota Padang. Parameter yang di analisis adalah sifat sensoris, kadar air, abu, lemak, protein dan karbohidrat, kalium dan kalsium*

Hasil: *Terdapat pengaruh penambahan tepung kecambah terhadap aroma, tekstur dan rasa kue semprong. Tidak ada pengaruh penambahan tepung kecambah terhadap warna kue semprong. Kue semprong perlakuan C (100% tepung beras dan 20% tepung kecambah) yang paling disukai panelis dan merupakan formula yang tepat. Kandungan gizi kue semprong C yang meliputi kadar air, abu, lemak dan protein berturut turut adalah 4,30%, 1,17%, 21,18%, dan 7,30%, dan kadar karbohidrat 53,36%. Bila dibandingkan dengan kue semprong kontrol terjadi peningkatan kandungan protein, karbohidrat dan kadar air kue semprong. Sedangkan kandungan gizi lainnya menurun*

Kesimpulan: *Hasil penelitian ini didapatkan kue semprong yang dipilih dan disukai adalah yang ditambahkan 20 % tepung kecambah kacang hijau dari tepung beras. Kue semprong meningkat kandungan protein, karbohidrat dan kadar air.*

KATA KUNCI*:* kue semprong; tepung kecambah kacang hijau; tepung beras ; organoleptik

ABSTRACT

Background: *The value of macronutrients contained in bean sprouts at the age of 24 hours, namely protein 30.47%, fat 0.44%, carbohydrates 65.97%. Sprouts have nutrients that are more easily absorbed by the body.*

Objectives: *The purpose of the study was to analyze the organoleptic quality of the semprong cake added with mung bean sprout flour and its nutritional content.*

Methods: *This study is an experimental study using a completely randomized design (CRD) with A (100% rice flour, control), B (100% rice flour and 10% sprout flour), C (100% rice flour and 20% sprout flour), D (100% rice flour and 30% sprout flour). It was repeated twice. Parameters analyzed were organoleptic properties of semprong cake. The organoleptic test was by Analysis of variance (ANOVA) if significant, it was continued with the Duncan New Multiple Test (DNMRT). Analysis of the nutritional content was carried out in the laboratory of the research and industrial standardization center in the city of Padang. Nutritional analyses were water content, ash, fat, protein, carbohydrates, potassium, and calcium.*

Results: *There is an effect of adding sprouted flour to the aroma, texture, and taste of the semprong cake. But no effect off adding sprouted flour on color semprong cake. The result of this research is that the selected and preferred semprong cake is that which is added 20% of mung bean sprout flour from rice flour. When compared with the control semprong cake, there was an increase in protein, carbohydrate, and water content. While the other nutritional content decreased. The nutritional content of the semprong cake is 4.30% water content, 1.17% ash content, 21.18% fat content, 7.30% protein content, and 53.36% carbohydrate content.*

Conclusions: *The semprong cake treatment C (100% rice flour and 20% sprouted flour) was the most preferred by the panelists and was the right formula and increase in protein, carbohydrate, and water content*

KEYWORDS*: semprong cake; mung bean sprout fluor; rice flour; and organoleptic*

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INTRODUCTION

According to data from the Central Bureau of Statistics (2016), national mung bean production fluctuated from 2011-2015, from 341,342 tons to 271,463 tons. Mung bean production in 2019 is projected to reach 309,400 tons. This large production of mung beans can be utilized in both fresh and processed forms. Mung beans are available in the market at a fairly affordable price of IDR 25,000 per kg .

100 g of mung beans contains 22.2 g of protein which is rich in the amino acid lysine (7.94%). Mung beans contain 125 mg of calcium and 320 mg of phosphorus in 100 g of green beans. Mung bean fat (1.64 g/100g) is much lower than soybeans (15.6 g/100g), therefore mung beans are very good for people who want to avoid high-fat consumption. The low fat in mung beans causes food or drinks made from green beans not to go rancid. Mung bean fat is composed of 73% unsaturated fatty acids and 27% saturated fatty acids (1).

Mung beans are one of the legumes that are rich in isoflavone protein content. Isoflavones are included in the flavonoid (1,2-diarylpropane) group and are the largest part of this group. Isoflavones are a type of estrogen compound that has high antioxidant activity (2). The quality of mung bean protein is close to that of animal protein. But in mung beans, there are anti-nutritional compounds (trypsin inhibitors, phytic acid, pentosan, tannins) that cause low absorption of nutrients in the body. Nutrients can be absorbed properly by the body if it has become sprouts .

Processed green beans in the form of sprouts called bean sprouts can increase their nutritional content. The vitamins and minerals found in bean sprouts are vitamin C, thiamin, riboflavin, niacin, vitamin A, vitamin E (α-tocopherol), and vitamin K. The minerals found in bean sprouts are calcium (Ca), iron (Fe), magnesium (Mg), phosphorus (P), potassium (K), sodium (Na), zinc (Zn), copper (Cu), manganese (Mn), and selenium (Se) (3).

The nutritional potential of mung bean sprouts is quite high, but the sprouts have a short shelf life so they spoil quickly. The macronutrient values found in green bean sprouts at the age of 24 hours are protein 30.47%, fat 0.44%, and carbohydrates 65.97%. The nutritional content contained in green bean sprouts is more complete. Not only protein content, but it also contains carbohydrates, fats, water, essential amino acids, and micronutrients which are easier for the body to digest than whole green beans (4).

The semprong cake is a popular traditional pastry for the community, the taste is not too sweet, the aroma is distinctive and crispy, the color is brownish yellow in the shape of a roll and some are in the shape of a triangle and a rectangle. Semprong cakes are generally made from rice flour, sugar, coconut milk, margarine, and eggs by roasting (5).

There is a need for further processing by making flour so that the shelf life is longer, so that mung bean sprout flour can be innovated into an additional ingredient in semprong cake which has the potential as a functional food. The purpose of this study was to evaluate the organoleptic quality and nutritional content of semprong cake made by adding mung bean sprout flour. Determine the appropriate additional percentage of mung bean sprout flour in making semprong cake.

MATERIALS AND METHODS

Research begins with the manufacture of sprouted flour. Mung bean sprout flour was prepared by roasting the sprouts for 10 minutes at a temperature of 75 - 95 ^{O}C and a germination time of 24 hours. The results obtained protein content of 19.54 g, fat of 4.29 g, and carbohydrates of 7.92 g. Contains 23.78 mg of Vitamin C and 451.02 mg of vitamin E and 18.54 g of fiber in 100 g of flour (3). The research design used was an experimental completely randomized design with one control, three treatments, and two replications. There were three treatments for the addition of mung bean sprout flour. Treatment B added 10%, treatment C added 20%, and treatment D 30% added from the rice flour used. Treatment A was a control semprong cake without the addition of sprouted flour. The composition of eggs, sugar, and coconut milk were the same in all treatments.

The semprong cake was made by mixing eggs and sugar using a high-speed mixer for 5 minutes until the dough expands. The dough is added with coconut milk and stirred using a mixer at medium speed for 3 minutes until the dough is evenly distributed and the addition of sprouted flour is according to the treatment. The next process was baked with fire directly on the semprong cake mold until cooked. The last process was the formation of the semprong cake into rolls.

Hedonic test to assess acceptability. In the analysis, the hedonic scale is transformed into a numerical scale. The hedonic scale of this study ranges from 1-5 where: 1 = dislike very much, 2 = do not like, 3 = somewhat like, 4 = like, and 5 = like very much. Organoleptic test panelists were conducted by undergraduate nutrition students. The data obtained from the organoleptic test results were analyzed based on the level of preference for color, aroma, texture, and taste, then the organoleptic test results were presented in tabular form to calculate the average value and then analyzed using analysis of variance at a significance level of 5%. If the F count is large from the F table, the treatment is significant for organoleptic attributes. It is continued with the *Duncan New Multiple Range Test (DNMRT) test* at a 5% significance level (6). The selected cakes were organoleptic test results, and control cakes were followed by nutrient content analysis. The analysis was carried out at the Padang Industrial Research and Standardization Laboratory. The method of analysis of nutrient levels with SNI 01-2891-1992 (7). The analysis includes items 9 for carbohydrates, items 7.1 for protein, 8.2 for total fat, and items 5.1 and 6.1 for water content and ash content.

RESULTS AND DISCUSSION

The results of the organoleptic assessment of the semprong cake, and the effect of adding green bean sprout flour to the semprong cake in the organoleptic test, can be seen in **figure 1**.

The average value of the panelists' preference for the color of the semprong cake from the hedonic test given by the panelists ranged from 3.68 to 3.88. The panelist's favorite color was treatment B (10% addition of green bean sprout flour) with an average value of 3.88 (like category). Based on the results of the ANOVA test, it was found that the calculated F value (0.30) < (2.76) F table at the 5% level so it was stated that there was no significance in the color of the semprong cake.

The average value of the panelists' preference for the aroma of the semprong cake as a result of the hedonic test given to the panelists ranged from 3.32 to 3.84. The most preferred aroma by the panelists was treatment C (20% addition of mung bean sprout flour) with an average value of 3.84% (like category). In contrast to the results of research by Amirahsari et al (2019) (8) the semprong cake

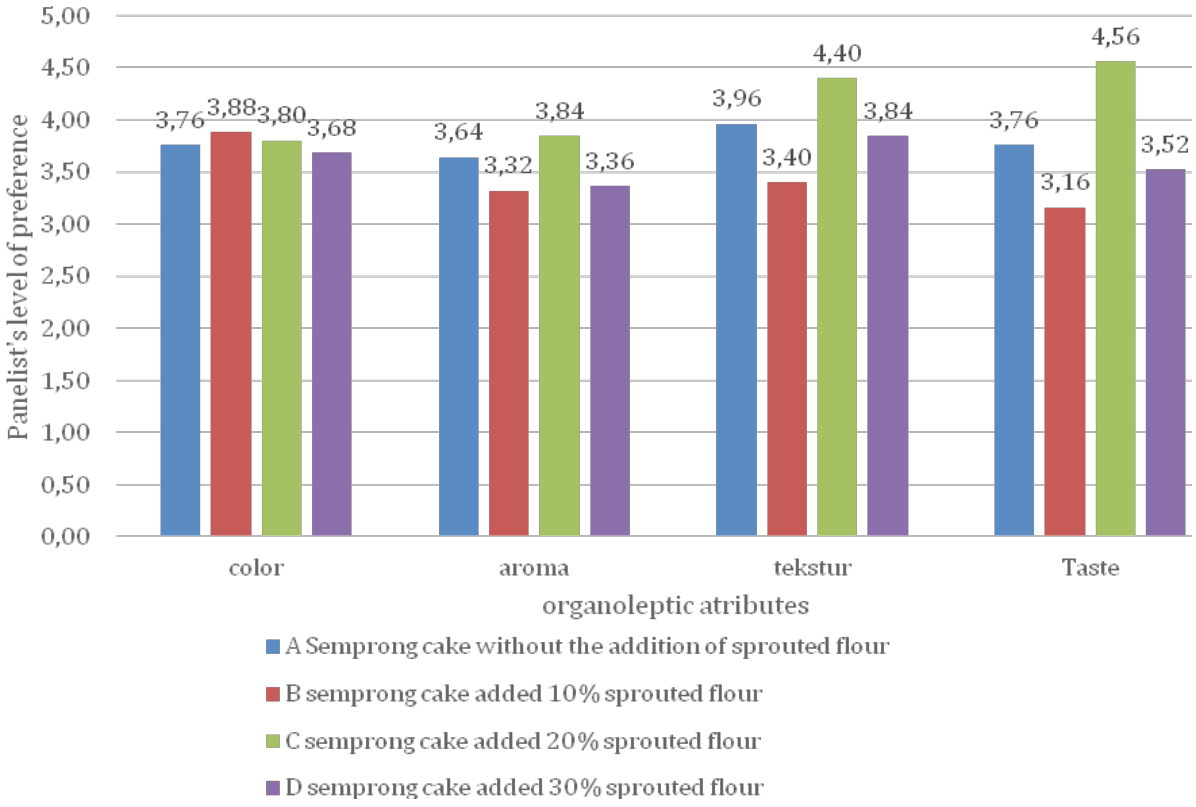

Figure 1. The result of the organoleptic test of the semprong cake added with sprouted flour

formula is preferred without the addition of tempeh flour and mung bean flour. Because of the bad smell. In this study, the aroma of bean sprouts smelled good. Based on the results of the ANOVA test, it was found that the calculated F value (4.68) > (2.76) F table at the 5% level so it was stated that there was a significant difference between treatments. The test results were continued with the *Duncan New Multiple Range test* (DNMRT)at a level of 5%, a significant difference was obtained, namely the semprong cake treatment C was significantly different from treatments A, B, and D.

The average value of the panelists' preference for texture on the hedonic test given panelists ranged from 3.40 to 4.40. The most preferred texture by panelists was treatment C (20% addition of mung bean sprout flour) with an average value of 4.40 (very like category). Based on the results of the ANOVA test, it was found that the calculated F value (7.50) > (2.76) F table at the 5% level so it was stated that there was a significant difference between treatments on the texture of the semprong cake. The test results were continued with the *Duncan New Multiple Range Testtest* (DNMRT)at a level of 5%, there was a significant difference between treatment B and treatment D, C was significantly different from treatment A, C was significantly different from treatment B, and C was significantly different from treatment D.

The average level of panelists' preference for taste in the hedonic test given by the panelists ranged from 3.16 to 4.56. The most preferred taste by panelists was treatment C (20% addition of mung bean sprout flour) with an average value of 4.56 (very like category). Based on the results of the ANOVA test, it was found that the calculated F value (15.18) > (2.76) F table at the 5% level so it was stated that there was a significant difference between treatments in the taste of the semprong cake. The test results were continued with the *Duncan New Multiple Range Testtest* (DNMRT) at a level of 5%, there was a significant difference between cake C and cake in treatments A, B, and D.

Semprong cake C (semprong cake with the addition of 20% mung bean sprout flour) had a

Table 1. The nutritional content of the semprong cake Nutritional

Content of the	Control semprong cake. The semprong	Cake added 20 % of sprouted flour	Standard value (SNI cake)
Moisture content	3.50	4.30	Max 5
Ash content	1.23	1.17	Max 1.5
Total fat	24.77	21.18	Min 9.5
Protein	5.38	7.30	Min 9
Carbs	43.66	53.36	Max 70
Energy	419	433	-

higher quality value for each indicator (color, aroma, texture, and taste) compared to other treatments. The results of this study are almost the same as that of Pujilestari and Larasati's (2019) (9) research. The selected cake is semprong cake with the formulation of rice flour and soybean pulp flour 80:20

Furthermore, this semprong cake was selected to test the nutritional content.

The results of the analysis of the nutritional content carried out meet all the SNI Number 2973-2011 quality requirements for cakes for water, ash, fat, protein, and carbohydrate content (10). According to **Table 1**, it can be seen that the results of the protein content test in the semprong cake in treatment A (without the addition of mung bean sprout flour) of 5.38%, after being given the addition of mung bean sprout flour of 20 g, the protein content increased to 7.30%. The increased protein content in the semprong cake was caused by the addition of mung bean sprout flour. The results of Uller et all (2017) (11) research found that the semprong cake made from 75% goroho banana flour and 25% sago flour) was the most preferred by the panelists and was the right formula and had a fractured power of 24 mm/g/sec and a chemical composition of 4.04% moisture. 1.7% ash content, 27.49% fat content, 3.35% protein content, and 63.42% carbohydrate content. compared to the semprong cake made by Uller et al. It has a high protein content of 3.95% .

The results of Amirahsari (2019) (8) research showed that the highest protein content in semprong cake with a value of 10.90% was found in the semprong cake formulation made from a mixture of 30 g rice flour, 20 g tempeh flour, and 60 g mung bean flour, while the lowest protein content with a value of 5.81% was found in in the semprong cake formulation which was not given any addition, either tempeh flour or mung bean flour. (12). However, the water content is quite high, about 40.54 because it contains beetroot jam.

Semprong C cake has a protein content of 7.30 g in 100 g of cake. 100 g of cake there are as many as 22 pieces. If you eat 5 pieces of semprong cake, you will get a protein intake of about 3 g of protein. This semprong cake does not contain flour so it is good as a distraction for children who are not allowed to eat gluten.

CONCLUSIONS AND RECOMMENDATION

The effect of adding mung bean sprout flour on the aroma, texture, and taste of semprong cake. The best formula semprong cake that the panelist liked was cake 20% sprouted flour added. The results of the test of protein, carbohydrate, and cake water levels increased after adding mung bean sprout flour. Meanwhile, fat and ash content decreased. All nutritional content has met the cake quality requirements according to the SNI standard for cakes. Suggestions from this research are recommended as a snack for special needs that are gluten-free. It is recommended for further research to see the shelf life.

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