The Substitution of Rice Bran Flour on the Acceptability and Color Characteristics of *Gracilaria* sp Seaweed Cake

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Abstract- Cake is a baked dough with the basic ingredients of flour, sugar, eggs and fat. The substitution of cake with rice bran flour can increase the nutritional value of the cake because it contains dietary fiber which is beneficial for the body's digestion. The purpose of this study was to determine the level of acceptance of panelists and the color characteristics of *Gracilaria* sp seaweed flour with substitution rice bran flour. The concentration used is 0% (A), 100% (B), 2.5% (C), 5% (D), and 7.5% (E). The results showed that the substitution of rice bran flour had a significant effect on the color of the cake.

Keywords: cake, *Gracilaria* sp seaweed, rice bran flour, color, substitution, organoleptic

I. INTRODUCTION

Cake is a semi-wet food product with basic ingredients of flour, sugar and eggs. In the cake with the addition of *Gracilaria* sp seaweed flour as the raw material for making cake, the results are not maximized in increasing nutritional value such as dietary fiber, it is necessary to add rice bran flour which is rich in fiber content. Rice bran is a food that has high nutritional and non-nutritional content, such as vitamin B, vitamin E, dietary fiber, protein, oil (essential fatty acids), and oryzanol. Bran is a good source of dietary fiber (soluble fiber and insoluble fiber). Soluble fiber has been shown to reduce blood cholesterol and LDL levels.[1] Rice bran has a protein content of 16.5%, fat content of 21.3%, carbohydrate content of 49.4%, and dietary fiber content of 25.3% .[2]

Product appearance is the most important attribute on a product, this is because the appearance of a good product tends to be considered to have a good taste and high quality. The appearance of a product in general can be determined by color. Colors can give the impression of liking before consumers consume these foods. Rice bran flour has a rather dark color, so it is necessary to do research to find out the substitution of rice bran flour for the color of *Gracilaria* sp seaweed cake and the panelist receiving power.

II. MATERIAL AND METHOD

Material

The main ingredients used are seaweed flour *Gracilaria* sp, rice bran flour, flour, refined sugar, eggs, margarine, skim milk, ovalet, and vanilla. While the tools used are digital scales, mixers, pans, and ovens. The tool used to test the color of cake is Chromameter CR-400.

Method

The method used in this research is the experimental method. The treatment used in this study was a variation of the concentration of rice bran flour. The experimental basis used in this study was a completely randomized design with 4 treatments and 5 replications. The substitution concentration of rice bran flour used is 0% (A). 100% (B), 2.5% (C), 5% (D), and 7.5% (E). Data were analyzed using the Kruskal-wallis test, and the color analysis was analyzed using the One Way ANOVA test.

Processing of cake

The cake making process is material preparation, shaking, printing, and baking. All cake-making ingredients are weighed according to the recipe. Margarine, ovalet and sugar are shaken first until white, then added eggs one by one and added with dry ingredients (wheat flour, seaweed flour *Gracilaria* sp and rice bran flour). After the cake mixture is mixed evenly, the mixture is poured into the mold (pan). The roasting process in an oven with a temperature of 160^0C for 35 minutes.

III. RESULT

Evaluation of hedonic organoleptic tests was carried out by panelists, which amounted to 100 people. The components assessed are appearance, aroma, taste, and texture. The organoleptiok test was used to determine the acceptability and preference of panelists for *Gracilaria* sp seaweed cake with substitution of bran flour. The results of organoleptic tests on Gracilaria sp seaweed cake with rice bran substitution can be seen in Table 1.

Table 1. Test of organoleptic *Gracilaria* sp seaweed cake substitution of rice bran flour

Treatment	Appearance	Flavor	Taste	Texture	Total
A (0%)	3,29	3,26	3,18	3,16	3,22
B (2.5%)	3,32	3,40	3,29	3,24	3,31
C (5%)	3,25	3,18	3,10	3,07	3,15
D (7.5%)	3,26	3,09	2,94	2,98	3,06

On the assessment of organoleptic parameters the highest value was obtained in treatment B (2.5%) and the lowest in treatment D (7.5%). The highest parameters of appearance were obtained in treatment B (2.5%) and the lowest in treatment C (5%). The highest parameters of flavour were obtained in treatment B (2.5%) and the lowest in treatment D (7.5%). The highest parameters of taste and texture were obtained in treatment B (2.5%) and the lowest in treatment D (7.5%). Overall, the panelists' acceptance of *Gracilaria* sp seaweed cake with rice bran substitution was obtained in treatment B with a value of 3.31.

The results of the color testing show that there is a real effect of *Gracilaria* sp seaweed cake with substitution of rice bran flour on the characteristics of Iightness (L), redness (a) and yellowness (b). This is indicated by the value of each characteristic which gives a value of $p < 0.05$. The color characteristics of *Gracilaria* sp seaweed cake with substitution of rice bran flour can be seen in Table 2, the Lightness (L) graph can be seen in Figure 1, the redness (a) graph can be seen in Figure 2 and the yellowness graph (b) can be seen in Figure 3.

Table 2. Characteristics of color *Gracilaria* sp seaweed cake substitution of rice bran flour

Treatment	Color		
	L*	a*	b*
A (0%)	$69,87 \pm 0,61^b$	$1,65 \pm 0,03^b$	$35,30 \pm 0,06^c$
B (2.5%)	$71,67 \pm 0,11^c$	$0,60 \pm 0,04^a$	$35,80 \pm 0,65^c$
C (5%)	$71,28 \pm 0,13^c$	$1,34 \pm 0,20^b$	$33,00 \pm 0,17^b$
D (7.5%)	$69,16 \pm 0,12^a$	$1,35 \pm 0,01^b$	$32,16 \pm 0,10^a$

Based on the ANOVA results, it can be analyzed that the different treatment of rice bran flour gives a significant effect ($p < 0.05$) on the color characteristics of lightness, redness and yellowness. Then proceed to Tukey's further test. In lightness characteristics, the A treatment obtained a lightness value of ($69,87 \pm 0,61^b$), B treatment obtained a lightness value of ($71,67 \pm 0,11^c$), C treatment obtained lightness value of ($71,28 \pm 0,13^c$) and D treatment obtained lightness value of ($69,16 \pm 0,12^a$). The graph of lightness values can be seen in Figure 1.

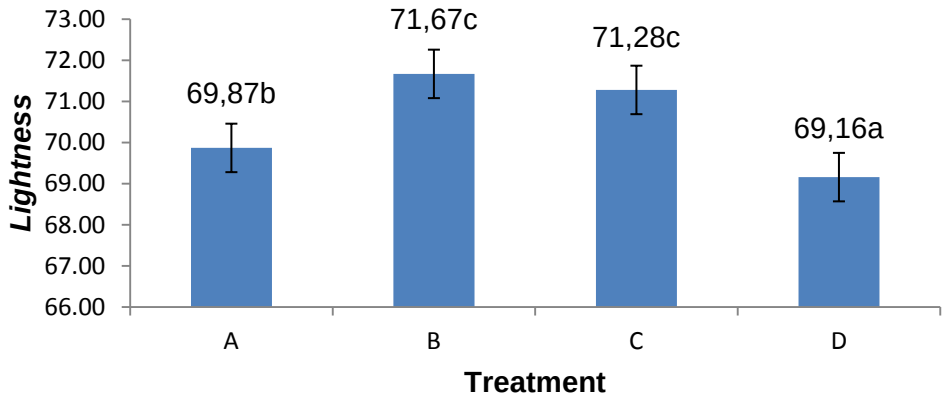

Figure 1. Graph of Lightness (L) *Gracilaria* sp seaweed cake with substitution of rice bran flour

In redness characteristics, the A treatment obtained a redness value of (1,65 ± 0,03[b]), B treatment obtained a redness value of (0,60 ± 0,04[a]), C treatment obtained redness value of (1,34 ± 0,20[b]) and D treatment obtained redness value of (1,35 ± 0,01[b]). Graph of redness value can be seen in Figure 2.

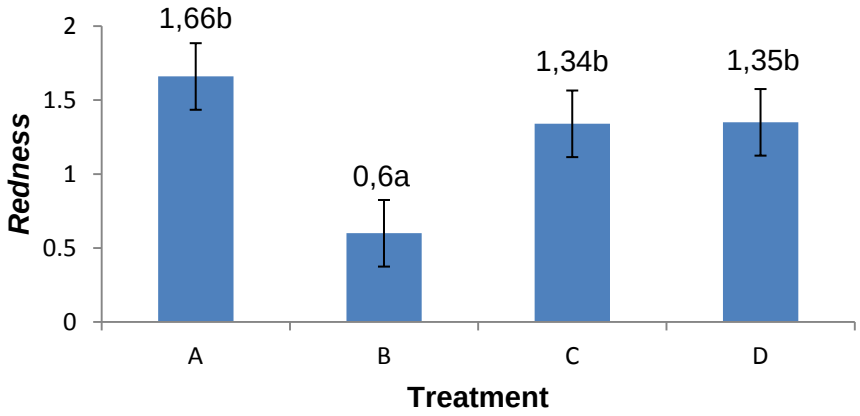

Figure 2. Graph of redness (a) *Gracilaria* sp seaweed cake with substitution of rice bran flour

In yellowness characteristics, A treatment obtained yellowness value of (35,30 ± 0,06[c]), B treatment obtained yellowness value of (35,80 ± 0,65[c]), C treatment obtained yellowness value of (33,00 ± 0,17[b]) and D treatment obtained yellowness value of (32,16 ± 0,10[a]). The graph of yellowness values can be seen in Figure 3.

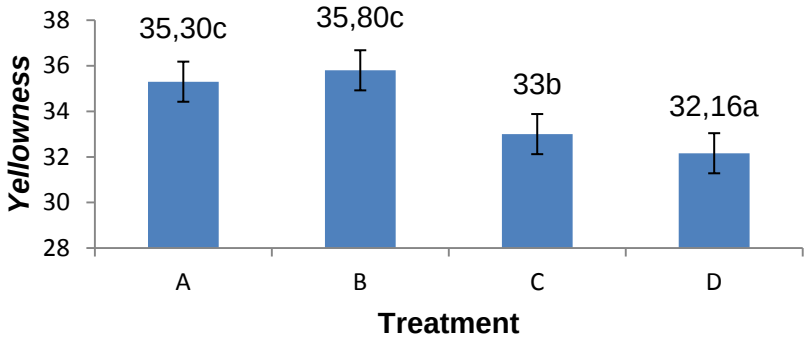

Figure 3. Yellowness graph (b*) Gracilaria* sp seaweed cake with substitution of rice bran flour

IV. DISCUSSION

Lightness (L*) is the brightness of color in food. L* values between 0 - 100 indicate colors from black to white. The value of lightness (L*) shows that the higher the substitution concentration of rice bran flour the lower the L value. The highest value of cake brightness of *Gracilaria* sp seaweed was found in treatment C (2.5%) which was 71.67 and the lowest value was found in treatment B (100%) which was equal to 57.71. The maillard reaction is one of the causes that affect the value of brightness in cake. maillard reaction is a non-enzymatic browning reaction associated with reducing sugar groups such as fructose, lactose, and maltose in a hot atmosphere causing the color of the food to become brownish. The maillard reaction to the cake occurs because of the high temperature heating process.[3]

Redness (a*) has a positive and negative range value. Positive values indicate red and negative indicates green. The highest a* value is obtained in treatment A (0%) of 1.65 and the lowest value is in treatment C (2.5%) which is equal to 0.60. The value of redness produced on cake can be affected due to the roasting process due to the reaction of the Maillard making. The values a * and L * values generated on cake are inversely proportional. The higher the L* value, the a* value will be lower.[4]

The higher the value of yellowness value (b) the more yellow the color will be. + b (positive) value from 0 to +70 for yellow and –b (negative) value from 0 to -70 for blue. The highest b value was obtained in treatment C (2.5%) of 35.80 and the lowest value was found in treatment B (100%) of 25.03. The yellowish color of cake is influenced by the addition of rice bran flour, the more addition of rice bran flour will reduce the yellowish color of the product and vice versa.[5]

V. CONCLUSION

Gracilaria sp seaweed cake with rice bran substitution can give a significant influence ($p < 0.05$) on the color produced, namely ligtness, redness, and yellowness. In addition, differences in the concentration of rice rice bran substitution also had an influence on the level of preference of panelists. The panelists' preferred concentration of rice bran flour was treatment C (2.5%).

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