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Effect of Seaweed Addition (*Eucheuma cottonii*) and CMC On Organoleptic Assessment of Mocaf Noodles

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Abstract. Mocaf Flour (Modified Cassava Flour) is a flour product of yams dioses using the principle of modifying cassava cells by fermentation. This study aimed to determine the influence of seaweed and CMC additions on the organoleptic assessment of Mocaf noodles. The research design used is a Complete Randomized Design (RAL) with 6 treatments that are a combination of proportions between Mocaf flour, seaweed and CMC (Mocaf flour: wheat: seaweed : CMC) R1= 50% : 47% : 2% : 1%, R2= 50% : 45% : 4% : 1%, R3 = 50% : 43% : 6% : 1%, R4 = 50% : 41% : 8% : 1% , R5 = 60% : 29% : 10% : 1%, R6= 98% : 2%. The results of the hedonic organoleptic assessment showed the best treatment obtained in the composition R4 = (50 g Mocaf, 41 g wheat, 8 g seaweed, and 1 g CMC) with an organoleptic value of 3.98 colors (likes), aromas 3.80 (likes), flavors 3.67 (likes) and textures 4.71 (very likes). Descriptive test results of color, aroma, and texture showed the best assessment obtained on R4 treatment with the organoleptic assessment of color qualified (somewhat yellow), aroma (attractive), and texture (chewy). So it can be concluded that the addition of seaweed and CMC has a real effect on the organoleptic assessment of Mocaf wet noodle products.

Keywords: Mocaf, seaweed,CMC, wet noodles.

INTRODUCTION

Instant noodles are one of the food products that are favored by the community. Generally, instant noodles on the market are processed products from wheat flour derived from wheat seeds. However, Indonesia is not a wheat-producing country. To minimize the use of wheat flour can be replaced by using MOCAF. An alternative to reduce dependence on wheat imports is to replace the role of wheat flour as the primary raw material of noodles by utilizing local cassava food (Manihot esculenta) into functional food products.

The tendencies and lifestyles of modern society demand ready meals. Food ingredients commonly consumed by the public as ready-to-eat food substitutes for rice is noodles. Noodles are generally made from wheat flour derived from wheat, and their existence still has to be imported from abroad.

Cassava (Minihot esculenta) is one of the sources of foods rich in carbohydrates. In addition, there is nutritional cardigan such as protein, vitamin C, calcium, iron, and vitamin B1, so cassava is suitable for consumption by the community. MOCAF is cassava flour that has been modified with the principle of fermentation by Lactic Acid Bacteria(BAL)[2]. Bal can produce enzymes that hydrolyze starch into sugar and convert it into organic acids, especially lactic acid. This causes a change in the characteristics of the flour produced in rising viscosity, glass ability, rehydration power, and ease of dissolving. In addition, the taste of MOCAF becomes neutral as it covers the image of cassava flavor up to 70% [3][4].

Wet noodles made from Mocaf flour with the best results are noodles with a ratio of raw materials 70% wheat flour and 30% Mocaf flour [5]. However, there are still shortcomings in the product, namely the texture of wet noodles

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that are still fragile, so it needs to be given other additives and increased the proportion of mocaf flour usage to 50%, which was previously only 30%. Therefore, it is necessary to use alternative foodstuffs as ingredients that can improve the texture of wet noodles with the addition of seaweed and CMC.

Seaweed (Eucheuma cottonii) is a low-level plant that has a content that plays a role in the improvement of texture is carrageenan [6][7]. With seaweed in the mixture of a wet noodle, the dough is expected to increase the fiber content in wet noodles. The coarse fibers present in seaweed in mixing noodles greatly influence the texture of noodles.

Carboxymethyl cellulose is a linear cellulose polymer ether and anion compound, biodegradable, colorless, odorless, non-toxic.

Carboxymethyl cellulose is derived from wood cellulose and cotton obtained from cellulose and monochloroacetic acid, with catalysts in alkaline compounds. Carboxymethyl cellulose is also a versatile compound that has important properties such as solubility, rheology, and adsorption on the surface. In addition to these properties, viscosity and degree of substitution are two of the most important factors of cellulose carboxymethyl, and cellulose carboxymethyl is used as a stabilizer, thickener, adhesive, and emulsifier. Based on the description, it is necessary to study the addition of seaweed and CMC to improve the texture of Mocaf noodles so that noodles are expected to be obtained from local mocaf foodstuffs that have a better texture than before and are beneficial for health.

MATERIALS AND METHODS

Mocaf Flour Making

Peel the cassava skin clean the mucus on the surface of the cassava with water, and rub it into thin pieces cassava with a knife or chopping tool until shaped like chips or chips. Soak in clean water for three days. Change water every 24 hours. Remove the soak, drain. Dry the chips, moisture content 10-12%. Mash or grind dry chips. Sift with a sieve the size of mesh granules 60 or 80 [11].

Seaweed Porridge Making

Preparation of seaweed samples, based on method [12] Dried seaweed used obtained from The Village Mambulu Sampolawa Subdistrict. The preparation stage of seaweed samples conducted [12]. It starts with choosing good quality dried seaweed, then washed. Seaweed is cut into small pieces with a size of 3-5 cm. Then seaweed soaked for 10 hours to clean the dirt on seaweed, then done rinsing with running water and slicing, then seaweed soaking with betel lime 10 g for 5 hours and drained again, for 5-6 minutes (while stirring). Then the seaweed is blended and cooked (while stirring) until the seaweed becomes porridge. Seaweed porridge must be ensured to be really smooth in order to facilitate the process of kneading and make the dough smooth.

Noodle Making

The method of making noodles refers to [13] The stages of making wet noodles consist of the mixing stage, roll press (sheet formation), steaming, noodle formation, cooling to packaging. In the first stage mocaf flour, wheat flour, seaweed pulp and CMCs are mixed then added water 25 ml, salt 1 g, and eggs 10 g. After the dough is smoothed, made a thin sheet then steamed. The sheets are then put in a noodle printer roller. The noodle strands are then boiled for 3 minutes then drained.

Organoleptic Testing

Determine mocaf wet noodles with the addition of seaweed porridge that the panelists most favor from each treatment. This method of testing by providing noodles with various formulations, then placed in the test container, each treatment is given a different code with an orderly arrangement then presented to 15 panelists to taste and assess

Research Design

The experimental design used in this study is a Complete RandomIzed Design (RAL) with 6 treatments that are a combination of proportions between Mocaf flour, seaweed porridge and CMC with a total amount of noodle dough as much as 100 grams and each treatment repeated 4 times so that 24 experimental units were obtained. The treatment is as follows: R1= Mocaf flour 50 g: wheat flour 47 g: seaweed porridge 2 g: CMC 1 g, R2= Mocaf flour 50g : wheat flour 45 g : seaweed porridge 4 g : CMC 1 g, R3 = Mocaf flour 50 g : wheat flour 43 g : seaweed porridge 6 g : CMC 1 g, R4= Mocaf flour 60 g : wheat flour 41 g : seaweed porridge 8 g : CMC 1 g, R5= Mocaf flour 50 g: wheat flour 39 g: seaweed porridge 10g: CMC 1g and R6= wheat flour 98 g: seaweed porridge 2 g.

Data Processing

The data obtained in this study was analyzed using SPSS 2016 One Way Anova to assess the panelist's acceptance of organoleptics and Mocaf noodles covering color, texture, taste and aroma, obtained organoleptic assessment that has a very real effect on observation variables then continued with Duncan's Multiple Range Test (DMRT) at a confidence level of 95% (α=0.05).

RESULTS AND DISCUSSION

Hedonic Organoletic Test

Mocaf noodle products with the addition of seaweed porridge and CMC to organoleptic assessment which includes the assessment of color, texture, aroma and taste are presented in Table 1.

TABLE 1. Organoleptic data Hedonilk mocaf noodles addition of seaweed porridge and CMC to organoleptic parameters: color, aroma, taste, texture and overalls.

Treatment (M:T:RL:)	Average Organoleptic Test Hedonic Seaweed Mocaf Noodles				
	color	aroma	taste	texture	Overall
R1 (50:47:2:1)	2,78 ± 0.23 a	2.86 ± 0.26 a	2.88 ± 0.17c	2.85 ± 0.19 b	2.75 ± 0.29 a
R2 (50:45:4:1)	2,85 ± 0.16 ab	2.83 ± 0.17 a	2.61 ± 0.08 ab	2.70 ± 0.03 b	2.69 ± 0.16 a
R3 (50:43:6:1)	3,05 ± 0.14 ab	2.76 ± 0.12 a	2.58 ± 0.19 ab	2.18 ± 0.06 a	2.55 ± 0.14 a
R4 (50:41:8:1)	3,98 ± 0.28 abc	3.80 ± 0.19 a	3.67 ± 0.12 bc	4.71 ± 0.35 a	3.67 ± 0.10 a
R5 (50:39:10:1)	2,88 ± 0.32 ab	2.94 ± 0.13 a	2.58 ± 0.19 ab	2.85 ± 0.13 b	2.80 ± 0.13 a
R6 (0:98:2:0)	4,16 ± 0.11 b	4.81 ± 0.08 c	4.39 ± 0.16 a	4.35 ± 0.31 a	4.76 ± 0.04 a

Description: The numbers followed by different letters show a noticeable difference based on the One Way Anova test (M = MocafFlour, T = Wheat Flour, BRL = Seaweed Porridge, = CMC).

Descriptive Organoleptic Color Test

Mocaf noodles with the addition of seaweed porridge and CMC that has a very real effect on color sensory assessment. Sensory test results of mocaf noodle color addition of seaweed porridge can be seen in Table 2.

TABLE 2. Sensory assessment of mocaf noodle color addition of seaweed slurry and CMC.

Treatment (M:T:RL:)	Average Descriptive Organoleptic Test Of Seaweed Mocaf Noodles	
	color	information
R1 (60:37:2:1)	2.76 ± 0.20ab	Slightly Yellowish
R2 (60:35:4:1)	2.50 ± 0.22a	Slightly Yellowish
R3 (60:33:6:1)	3.06 ± 0.18 b	Slightly Yellowish
R4 (60:31:8:1)	3.95 ± 0.19b	Yellowish White
R5 (60:29:10:1)	2.43 ± 0.35a	pale
R6 (0:98:2:0)	4.08 ± 0.18b	Yellowish White

Description: WM = Mocaf Flour, T = Wheat Flour, BRL = Seaweed Porridge, CMC= CMC. Score 5 = Very Yellowish White, 4 = Yellowish White, 3 = Slightly Yellowish, 2 = Pale, 1= Very Pale. (Eligibility scorelimit n = 2.50)

Descriptive Organoleptic Aroma Test

Mocaf noodle products with the addition of seaweed and CMC that has a very real effect on the sensory assessment of aroma. The average sensory test result of mocaf noodle color in addition to seaweed slurry can be seen in Table 3.

TABLE 3. The average sensory test result of mocaf noodle color in addition to seaweed

Treatment (M:T:RL:)	Average Descriptive Organoleptic Test Of Seaweed Mocaf Noodles	
	Aroma	information
R1 (50:47:2:1)	2.83 ± 0.26a	Somewhat Interesting
R2 (50:45:4:1)	2.81 ± 0.16 a	Somewhat Interesting
R3 (50:43:6:1)	2.90 ± 0.13 a	Somewhat Interesting
R4 (50:41:8:1)	3.83 ± 0.10 a	Interesting
R5 (50:39:10:1)	2.86 ± 0.22 ab	Somewhat Interesting
R6 (0:98:2:0)	4.90 ± 0.03 a	Very Interesting

Description: WM = Mocaf Flour, T = Wheat Flour, BRL = Seaweed Porridge, CMC= CMC. Score 5 = Very Interesting, 4 = Interesting, 3 = Somewhat Interesting, 2 = Unattractive, 1 = Very Unattractive. (Eligibility score limit = 2.50

Descriptive Organoleptic texture Test

Mocaf noodle products with the addition of seaweed porridge and CMC that has a very noticeable effect on sensory assessment of texture. The average sensory test result of mocaf noodle texture in addition to seaweed porridge is presented in Table 4.

TABLE 4. The average sensory test result of mocaf noodle texture in addition to seaweed porridge

Treatment (M:T:RL:)	Average Descriptive Organoleptic Test Of Seaweed Mocaf Noodles	
	texture	information
R1 (50:47:2:1)	2.56 ± 0.12a	Somewhat Chewy
R2 (50:45:4:1)	2.56 ± 0.20a	Somewhat Chewy
R3 (50:43:6:1)	2.83 ± 0.06a	Somewhat Chewy
R4 (50:41:8:1)	3.95 ± 0.16b	Chewy
R5 (50:39:10:1)	2.58 ± 0.08b	Somewhat Chewy
R6 (0:98:2:0)	4,23 ± 0.15c	Very Chewy

Description: WM = Mocaf Flour, T = Wheat Flour, BRL = Seaweed Porridge, CMC= CMC. Score 5 = Very Chewy, 4 = Chewy, 3: Somewhat Chewy, 2 = Flaccid, 1 = Very Mushy. (Eligibility score limit = 2.50)

Discussion

Based on the data in Table 1 shows that the treatment of Mocaf noodles with the addition of seaweed porridge shows a very real influence on organoleptic assessment of color, aroma, taste and texture. The hedonic test was intended to determine the panelist's favorite response to Mocaf noodle products in addition to seaweed porridge. The test used 15 panelists. Hedonic tests are conducted on four parameters, namely color, aroma, taste and texture because the level of consumer preference for a product is influenced by color, aroma, taste, and mouth stimulation. Organoleptic assessment is intended to determine the panelist's assessment of the resulting product. Organoleptic testing is a way of assessing by utilizing the five human senses to observe the texture, color, shape, aroma and taste of a food product.

Based on the results of the study obtained that the treatment of R4 is the best treatment seen from the percentage of acceptance of the highest level of fondness in the treatment R4 (Mocaf 50 g: wheat flour 41 g: seaweed porridge 8 g: CMC 1g) of 3.98 (very like). The level of preference of panelists to the color of Mocaf seaweed porridge addition

is influenced by several factors including the color of egg yolk which is an additional ingredient in the process of making Mocaf noodles. The color of noodles in general is yellowish white [16] [17] [18]. egg yolk is also a color give color tothe noodles and make the noodles taste more savory.

The results of the favorite test can be known that the panelists liked the color of mocaf noodles the addition of seaweed porridge to the criteria of very likes to likes from the highest level of favorite acceptance to the lowest level of favorite acceptance. Based on the results of the study obtained that the treatment of R4 is the best treatment seen from the percentage of acceptance of the highest level of fondness in the treatment R4 (Mocaf 50 g: wheat flour 41 g: seaweed pulp 8 g: CMC 1 g) of 3.98 (likes). The level of preference of panelists to the color of Mocaf seaweed porridge addition is influenced by several factors including the color of egg yolk which is an additional ingredient in the process of making Mocaf noodles. In this study, wet noodles were made without the addition of artificial dyes, the color seen in each noodle dough did not have a significant difference in each treatment. The color of seaweed is clear, so the increasing addition of seaweed has no major effect on the color of noodles[19].

Based on the results of the study obtained that the treatment R4 (Mocaf 50 g: wheat flour 41 g: seaweed porridge 8 g: CMC1 g) of 3.80 (likes) is the best treatment seen from the percentage of acceptance of the highest level of preference. This indicates the aroma of Mocaf noodles with the addition of seaweed produced favored by panelists. The resulting aroma is caused by the addition of seaweed and other additives so as to produce a distinctive noodle aroma [20]. The results of the study [21] test the preference of noodle aroma to panelists obtained an average aroma value of 3.97% (very like). In theory seaweed contains more carbohydrates as its food reserves. Therefore, granule starch will undergo hydrolysis that produces monosaccharides as raw materials to produce organic acids. This organic compound will be inbibisi in the material and when the material is processed will be able to produce aroma.

The results of the favorite test can be known that the panelists liked the taste of Mocaf noodles the addition of seaweed porridge to the highest favorite acceptance criteria to the lowest level of favorite acceptance. Based on the results of the study obtained that the treatment of R4 (Mocaf 50 g: wheat flour 41 g: seaweed porridge 8 g: CMC 1 g) of 3.67 (likes) This is due to the level of preference of panelists to the taste of Mocaf noodles with the addition of seaweed porridge influenced by several factors including the addition of salt and seaweed porridge so as to produce a good taste. The results [21] showed that the treatment of P3 (sago flour 30 g, sweet potato orange 35 g, wheat flour 15 g and seaweed porridge 20 g) and P2 (sago flour 30 g, sweet potato orange 35 g, wheat flour 10 g and seaweed porridge 25 g) is the best treatment seen from the percentage of acceptance of the highest level of fondness P3 (3.98%) and P2 (3.45%) to the average taste value of noodles for the releaser. The increase in the percentage of flavor is due to the addition of seaweed porridge and the addition of 15 g of wheat flour. The presence of starch granules from seaweed pulp and wheat flour can affect the panelist's assessment of the taste of wet noodles. Granule starch will undergo hydrolysis that produces monosaccharides as raw materials to produce organic acids. This organic compound will be ambitious in the ingredients and when the material is processed will be able to produce a distinctive aroma and taste.

Based on the results of the study obtained that the treatment R4 (Mocaf 50 g: wheat flour 41 g: seaweed porridge 8 g: CMC 1 g) amounted to 4.67 (very preferred). This is thought to be due to the addition of seaweed porridge and CMC containing gel in Mocaf noodles the addition of seaweed porridge so as to produce noodles that are more chewy and not easily broken. Based on the data in Table 2, information was obtained that the color sensory test results of mocaf noodle products added the highest seaweed slurry in the R4 treatment of 3.95 (Yellowish White). Based on research [19], the color produced from seaweed wet noodles is clear, so the increasing number of seaweed additions has no major effect on the color of noodles. Seaweed porridge with a percentage of 13% to 25.9% of the weight of wheat flour is not much different when viewed directly by the eye.

Based on the data in Table 3 obtained information that the results of sensory aroma test of mocaf noodle products the highest seaweed addition to the treatment R4 of 3.83 (Interesting). Aroma parameters show no noticeable difference between the best treatment dry noodles and control dry noodles. The characteristics of stabilizing substances used by 50% produce odorless, colorless, and solid-shaped aromas so that they have no effect when added to foodstuffs According to [6] states that aroma determines the delicacy of a product that occurs due to the presence of a number of volatile components derived from the product that can be detected by the sense of smell. [22] [23] which states that this change in aroma can also be determined by the composition of the ingredients and the mechanism of the reaction, so that the aroma is also thought to be a combination of glucose degradation results, namely formaldehyde and furyldialdehyde.

Based on the data in Table 4 obtained information that the results of sensory texture test of mocaf noodle products the addition of seaweed porridge highest in the treatment of R4 by 3.95 (Chewy). Based on the results of the study [24], it was obtained that the treatment of R2 (78.75%) is the best treatment, according to the highest level of fondness for textures. This is thought to be due to the addition of seaweed flour with different concentrations resulting in the

chewy noodles also differ from one treatment to another due to the gel content contained in seaweed. While the study [22], showed the highest average amount of texture in seaweed wet noodles is in the treatment of R2 with the addition of seaweed flour as much as 10% which is 7.08. This is because with the addition of seaweed as much as 10% texture on wet noodles produced neutral like noodles in general (not too chewy, elastic and not too dense). The texture of wet noodles without the addition of seaweed has a smooth texture whereas with the addition of seaweed, the texture of wet noodles turns a bit rough, because the grains of seaweed flour used can still be felt by thepanelists[25][8].

CONCLUSION

Based on the results of the study can be concluded that the addition of seaweed porridge and CMC has a very real effect on the organoleptic assessment of the texture of mocaf wet noodle products and selected formulations on the R4 treatment

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