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Physical, chemical, stickiness and organoleptic characteristics of analog white sweet potato rice with the addition of pumpkin flours

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Abstract. This study aims to determine the effect of the addition of pumpkin flours on the process of making white sweet potato analog-based rice to color, water content, protein content, fat content, fiber content, ash content, carbohydrate content, total caloric value, extinction and organoleptic. The completely randomized design (CRD) with 5 treatments and 4 replications was used in as research design. The collected data were color testing, proximate content, total calories, and organoleptics. Proximate content analysis, total calories were explained descriptively and color analysis with Anova (Analysis of Variance) with a significant level of 5%, and if there was a significant effect, further tests would be carried out using the Duncan's Multiple Range Test (DMRT). Organoleptic test parameters were analyzed using Kruskal-Wallis non parametric with a significance level of 5% and if there was an influence it would proceed with the *Mann-Whitney*. The results showed that the addition of pumpkin flour had a significant effect ($p < 0.05$) on increasing water content, ash content, fat content, protein content, fiber content, and decreased carbohydrate. Organoleptic test results showed that the addition of pumpkin flour significantly affected the aroma, taste, texture, adhesiveness and flatness of analog rice.

1. Introduction

White sweet potato (*Lpomea batatas* Linneaus) also known as hair yam, is a tropical and subtropical annual tree. The Umbria is widely known as the main producer of peas. Sweet potato (*Ipomoea batatas* L.) is one of the agricultural products that contain carbohydrates and sources of calories that are quite high, a source of vitamins (A, C, B1, and B2), minerals (Fe, P, and Ca), protein, fat, and crude fiber. [21]. While pumpkin, Pumpkin has a fairly complete nutritional content such as protein, and vitamins. Because of its fairly complete nutritional content, pumpkin can be a very potential source of nutrition and the price is affordable for people who need it. It can be made also as food ingredients. On the other hand, the fruits of these vines are very rich in fiber, vitamins, minerals and air [12]. Analog rice Analog rice is an imitation of rice made from materials such as tubers and cereals that have the shape or nutritional composition similar to rice. Specifically, for nutritional composition, analog rice is even higher than it should be [13]. The advantages of analog rice products are analog rice as a source of fiber derived from the ingredients used.

In making this analog rice, the process involves an emulsifier consisting of glycerol monostearate (GMS). This material is needed to produce artificial rice which has the characteristics of not needing to be sticky, both during processing and in the final product. [25] Regulate the manufacture of rice



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analog by using emulsifiers consisting of glycerol monostearate (GMS), soy lecithin, and sodium lactylate (SSL). GMS is an organic molecule used as an emulsifier in food. GMS is a food additive with the GRASS category according to Codex INS with number 471. GMS, glyceraldehyde and lecithin from soybeans can be used for extruding products, to improve texture, increase adhesive power, and improve the final product after the hydration process [10].

This study aims to determine the effect of adding pumpkin flour on the process of making analog rice based on white sweet potato on physical characteristics (color), chemical characteristics (water content, protein content, fat content, fiber content, ash content, carbohydrate content, total calorie value, flatness and organoleptic. Physical characteristics show analog rice to resemble rice such as shape and color. Chemical characteristics indicate the nutritional content of analog rice, while deafness and organoleptic indicate community acceptance of analog rice. The benefits of this research are obtaining scientific information to reduce the high consumption of rice and utilize the potential of white sweet potato and pumpkin as functional food, as well as utilize local food sources in food diversification efforts.

2. Materials and Methods

2.1. Materials

The ingredients used are white sweet potato and pumpkin obtained from the local market, while mocaf flour is obtained from Putri 21 UKM products, Gunungkidul, Yogyakarta, water, and baking soda / gsm. The tools used in this study were extruder, analytical balance, grinder, 80 mesh sieve, oven, porcelain cup, tongs, desiccator, baking pan, steamer, tray, spoon, kitchen knife, scissors, jar, chopper, and stove.

2.2. Making White Sweet Potato Flour

The making of white sweet potato flour is done according to the method [11], namely sweet potatoes peeled, washed with running water, and thinly sliced ± 2 mm. Sweet potatoes are steamed for ± 10 minutes and then dried in the oven for 6 hours at 60 °C. The dried yam is then mashed with a grinder to obtain powder and sieved with an 80-mesh sieve.

2.3. Making Pumpkin Flour

The making of pumpkin flour is done by peeled pumpkin, washed first, sliced thin ± 2 mm then dried in the oven for 9 hours at a temperature of 60 °C, then the dried yellow pumpkin then mashed using a grinder and sieved with 80 mesh sieves.

2.4. Making Analog Rice

White sweet potato flour, pumpkin and mocaf are weighed with a predetermined composition. White sweet potato flour, pumpkin flour and mocaf are stirred until a smooth mixture is formed. The smooth dough is then steamed for 15 minutes then printed with an extruder. The analog rice formed was subsequently dried with sunlight for 3 hours [18] with modification.

2.5. Colour

To find out the brightness of a colour can be done with colorimeter testing [3]. This test is carried out to detect one object in the analysis process using a camera lens against homogeneous coloured objects. This test is done by taking several position points on objects with the same lighting level in the sample to produce a color test [16].

2.6. Fat Level Test

Fat content is measured using the Soxhlet method. The sample was weighed as much as 2 g then wrapped in fine filter paper and put in an oven at 100 °C for 4 hours. Samples are taken, weighed, then put into the desiccator for 15 minutes and weighed. The sample was then reheated into an oven at 100 °C for 1 hour. Then it is put into the desiccator for 15 minutes and weighed until it reaches a

constant weight and is recorded as weight B. All samples are put into soxhlet extraction. Then, put the ether solution into the extractor as much as 2.5 - 3 times the volume of the flask that has been filled in the sample. Then, the condenser is installed. The heating flask is connected to the heating source. The water tap is opened, and the extraction process is carried out for a minimum of 6 hours. After 6 hours of extraction, the heater is turned off and the sample is removed from the extractor. Then, aired for 30 minutes in the open air. The sample was dried in an oven at 100 °C for 1 hour. Then put in the desiccator for 15 minutes [8].

2.7. Testing Protein Levels

Protein content testing is done by the Kjeldahl method. Samples were weighed 0.5 g and put into the kjeldahl flask. Then, the selenium mixture catalyst is added as much as 0.5 grams. Then added technical sulfuric acid (concentrated) as much as 10 ml. Then the sample is decocated and exposed to the wall until it is clear green in acid cupboards, then cooled. Then, the distillation process was carried out using a 4% H₃BO₃ trap of 5 ml with a measuring pipette and given 2 drops of MR and MB indicators. The sample that has been degraded is put into a distillation flask then add 100 ml of distilled water and 40 ml of 45% NaOH. Then, carried out distillation until the catcher changes color from purple to green and obtained as much as 40 ml distillate. Then repeated the procedure for making blanks without samples. The distillate is then titrated using 0.1 N HCl to form a purple color [8].

2.8. Ash Level Testing

The sample used for the test of water content is as much as 10 g put into a porcelain cup, then put into an electric furnace with a temperature of 400-600 ° C until the sample is whitish. The cup containing the sample is then removed, transferred into a desiccator and cooled and then weighed [8].

2.9. Carbohydrate

Carbohydrate content analysis is done by rough calculation or also called carbohydrate by difference referring to [4] with modifications.

2.10. Total Calories

Total calories in food can be calculated indirectly, based on carbohydrate, protein and fat content. 1 gram of carbohydrate is equivalent to 4 calories, 1 gram of protein is equivalent to 4 calories and 1 gram of fat is equivalent to 9 calories. Energy values are expressed in kilocalories (Kcal) and also in kilojoules (Kj) [6].

2.11. Organoleptic Testing

Organoleptic test and analog rice extinction were tested by 25 semi-trained panelists. Each panelist was given samples to be tested, mineral water (neutralizing taste), and score sheet. Panelists assessed the score sheets that were given by giving a 1-4 scale score for each parameter [1]. The attributes assessed in this ranking test are aroma (pumpkin), taste (sweet), texture (soft), stickiness (stickiness), and stickiness (fluffiness).

2.12. Processing and data analysis

Data on the results of color testing, proximate content, total calories, and organoleptics. Proximate content analysis, total calories are explained descriptively and color analysis with Anova (*Analysis of Variance*) with a significant level of 5%, and if there is a real effect, further tests will be carried out using the *Duncan's Multiple Range Test* (DMRT). Organoleptic test parameters were analyzed using Kruskal-Wallis non parametric with a significance level of 5% and if there is an influence it will proceed with the *Mann-Whitney test*. All data analyzes were calculated with the help of the computer program SPSS 22.0 for windows.

3. Results and Discussion

3.1. Color

The results of color analysis of white sweet potato analog rice with the addition of pumpkin flour are presented in Table 1

Table 1. Lightness (White) Analog Sweet Potato Rice With Addition of Pumpkin.

Treatment	Lightness color
T0	31,50 ± 0,57 ^d
T1	22,75 ± 0,95 ^{bc}
T2	23,75 ± 0,95 ^c
T3	22,25 ± 0,95 ^b
T4	16,50 ± 1,00 ^a

Data in Table 1. above, it is known that the colour value of white sweet potato analog rice with the addition of pumpkin can have a significant effect ($p < 0.05$). The colour in the T0 treatments were significantly different from T1, T2, T3, T4, whereas the T1 treatments were significantly different from T0 and T4 but were not significantly different from T2 and T3. colour of Lightness (brightness) of analog white sweet potato rice with the addition of yellow pumpkin has decreased significantly as the concentration of pumpkin added is increased, because the higher the concentration of pumpkin can reduce the brightness of analog rice. This happens because the pumpkin has a yellow colour than white sweet potato. Treatments that did not use pumpkin had a brighter colour, whereas the treatment with the addition of pumpkin had a darker colour. This is in accordance with the opinion of [26] which states that pumpkin contains β -carotene as much as 80%. β -carotene is a pigment that is yellow to orange, if the concentration increases, the resulting colour will be darker. In the process of making analog rice there is a heating process, steaming which can result in the caramelization process in the sugar contained in rice, so that the resulting colour is also getting darker. This is in accordance with the opinion of [11] which states that there is a change in colour caused by the cooking process, so that the heated sugar will occur non-enzymatic browning reaction. According to [25] L value indicates lightness or brightness where the range of numbers that are from 0 to 100. The smaller the number or close to 0, it means the material displays the colour darker / dull and the higher the number up to 100 displays the colour that is getting bright.

3.2. Chemical Characteristics

Table 2. Results of Analysis of Fat Levels, Protein Levels, Ash Levels, Carbohydrates, Total Calories of White Sweet Potato Analog Rice with Addition of Pumpkin Flour.

Testing Parameters	T0	T1	T2	T3	T4
Ash Content%	0,61	0, 61	0, 62	0, 64	0, 64
Fat level %	0,52	0, 51	0, 56	0, 57	0, 59
Protein%	3,70	3,93	3,98	4,10	4,32
Carbohydrate%	81,10	80,48	79,95	79,67	78,30
Total Calories cal/100 g	342,88	342,23	340,76	340,21	335,79

3.3. Ash Levels

The results of the analysis of ash content in white sweet potato analog rice and pumpkin T0, T1, T2, T3, and T4 respectively according to the table, namely 0.61%; 0.61%; 0.62%; 0.64%; 0.64%. Increasing the concentration of pumpkin flour can increase the level of analog rice ash. Large ash content in food products indicates the high minerals found in food products such as iodine, sodium, and potassium. This is consistent with the opinion of [2] which states that the ash content of an ingredient is related to the mineral content of the material. The mineral element is also known as an inorganic substance or ash content. Analog ash content produced ranged from 1.27-2.34% (bk). According to [23] ash is an organic substance left over from combustion of an organic material. The ash content of foodstuffs and their composition depends on the type of material and how they are ignited. Ash content has to do with minerals of an ingredient. Ash content in a food item indicates the presence of inorganic mineral content in the food material. Ash content is a material that is left behind when food is flattened and burned at temperatures around 500° - 800°C. that foodstuffs undergoing a cooking process can decrease and increase the ash content of the fresh ingredients. The T4 treatment has the highest ash content but also has the darkest colour, this can be due to the T4 treatment which has the highest concentration of pumpkin flour addition. This is in accordance with the opinion of [26] which states that the higher the ash content, the resulting colour will be darker.

Things that can affect the analog ash content of rice include the ash content of the analog rice raw material itself and is influenced by the cooking process. This is consistent with the opinion of [26] stated that ash content increased due to the water coming out due to the steaming process. Supported by the opinion of [28] states that the increase in ash content is due to the steaming process which causes the water content to decrease, so there is concentration of the remaining materials, one of which is mineral. High ash content in flour is not preferred because it tends to give a dark colour to the product. The lower the ash content in flour products the better, because the ash content in addition to affecting the final colour of the product will also affect the stability of the dough. According to [1] states that the standard quality of sweet potato flour in Indonesia is a maximum water content of 10%, a maximum ash content of 3%, a maximum fat content of 1%, a minimum protein content of 3%, a minimum crude fiber content of 2%, and a content of carbohydrates at % least 85%

3.4. Fat level

The results of the analysis of fat content in analog rice with white sweet potato and pumpkin T0, T1, T2, T3, and T4 are in accordance with the table, which is 0.52%; 0.51%; 0.56%; 0.57%; 0.59%. It can be seen that the value of fat content tends to increase with the addition of pumpkin concentration, this can be derived from the material itself, pumpkin flour has a higher fat content compared to sweet potato flour, so analog rice with the treatment of adding the most yellow pumpkin flour have higher fat content as well compared to other treatments. This is consistent with the opinion of [7] which states that analog rice containing the highest fat content is found in analog rice with high fat content of raw materials as well. Based on the results obtained, the T4 treatment has a higher fat content compared to the others. This can be interpreted as analogous rice with T4 treatment can be a potential food source of vegetable fat. This is consistent with the opinion of [17] which states that flour with not low-fat content has the potential as a food source of vegetable fats that has a positive effect on health. But the fat content that is too high can cause the product to cause rancidity. This is in accordance with the opinion of [3] which states that a food item that has a water cadra or too high a fat content can also cause rancidity, making it less profitable in the process of storing food. The value of fat content can also be influenced by the processing or heating process. This is not in accordance with the opinion of [24] also states that heating can cause fat loss due to the formation of volatile carbonyl compounds, exposed acids, ketone acids and so on. This is supported by the opinion of [23] which states that in general after the processing of food will damage the fat. The degree of damage varies greatly depending on the temperature used and the length of processing time. The higher the temperature used, the more intense the damage to fat.

3.5. Protein levels

The results of the analysis of protein levels in white sweet potato analog rice and pumpkin T0, T1, T2, T3, and T4 were in accordance with the table, namely 3.70%; 3.93%; 3.98%; 4.10%; 4.32%. Based on the results obtained can be seen that the addition of pumpkin flour can increase levels of analog rice protein. This is in accordance with the opinion of [24] which states that the level of analog rice protein is lower than that of sosoh rice. The functional properties of proteins determine the hedonic attributes of the food products produced. According to [17] the functional characteristics of protein from food ingredients influence the quality of a food product. The process of heating in the extruder is a process that can affect the functional properties of proteins. According to [26] protein and fat content can affect the level of IG (Glycemic Index). The higher the protein and fat content, the lower the IG (Glycemic Index) value.

Based on Table 2. it is known that the treatment that has the lowest protein content is the T0 treatment. In the treatment T0 has a composition without the addition of pumpkin, and white sweet potato concentration is higher. White sweet potato has more starch than pumpkin, causing its protein content to be low. This is in accordance with the opinion of [8] which states that the higher the starch composition in analog rice, the lower the protein content because the water-soluble protein is partially wasted in the starch-making process.

3.6. Carbohydrate

The results of the analysis of carbohydrate content in analog rice with white sweet potato and yellow pumpkin T0, T1, T2, T3, and T4 respectively according to the table, namely 81.10%; 80.48%; 79.95%; 79.67%; 78.30%. Based on the results obtained, it can be seen that the increasing concentration of the addition of pumpkin, the carbohydrate content of analog rice decreases. This can be due to the carbohydrate content of the raw material of pumpkin flour itself is lower than other flour, so that it can affect the carbohydrate content in the final product. This is consistent with the opinion of [22] which states that the value of the Smart Rice carbohydrate content is influenced by the carbohydrate content of the raw material. Another thing that can affect carbohydrate levels is the heating process. The lower water content, fat content, and protein content can increase carbohydrate content of food products. This is in accordance with the opinion of [21] which states that the heating process can cause a decrease in water content in rice so that by calculating the difference in carbohydrate levels can increase. The interaction between carbohydrates with other components of the material is also a factor in increasing carbohydrate levels. According to [20] the heating process will result in the interaction between carbohydrates and other components such as protein and fat, thereby reducing levels of fat or protein and increasing the amount of carbohydrates. According to [19] Components that have an important role are carbohydrates. Based on the results obtained carbohydrate content in white sweet potato flour by 87.98%, carbohydrates in moccaf flour by 88.02%, while carbohydrates in pumpkin flour by 87.78%. According to the Directorate of Nutrition of the Ministry of Health of the Republic of Indonesia (1996) There is a difference between the results of the analysis with the literature due to the different types of sweet potatoes and taro used for analysis. The difference in carbohydrate content in sweet potatoes, taro and corn can be affected by varieties and harvest age of the three.

3.7. Organoleptic testing

Table 3. Results of Organoleptic Analysis of White Sweet Potato Analog Rice with the addition of pumpkin.

Treatment	Aroma	Texture	Adhesiveness	Decision	Favorite overalls
T0	1,00 ± 0,00 ^a	2,20 ± 0,64 ^a	2,00 ± 0,00 ^a	2,20 ± 0,41 ^a	2,40 ± 0,64 ^a
T1	1,88 ± 0,33 ^b	2,40 ± 0,50 ^{ab}	2,12 ± 0,33 ^a	2,32 ± 0,47 ^a	2,40 ± 0,57 ^a
T2	2,32 ± 0,47 ^c	2,68 ± 0,63 ^b	2,80 ± 0,41 ^b	2,88 ± 0,44 ^b	3,04 ± 0,61 ^b

T3	2,96 ± 0,35 ^d	2,60 ± 0,64 ^{ab}	3,16 ± 0,37 ^c	3,32 ± 0,47 ^c	3,04 ± 0,54 ^b
T4	3,52 ± 0,54 ^e	2,52 ± 0,87 ^{ab}	3,56 ± 0,51 ^d	3,48 ± 0,51 ^c	2,48 ± 0,51 ^a

3.8. Aroma

Based on the organoleptic test results presented in Table 3, it is known that the addition of pumpkin flour formulation in the manufacture of white sweet potato analog rice to the aroma parameters of the product, panelists can distinguish the aroma of the pumpkin being tested. The highest intensities according to Table 2, are in the order of treatment T4, T3, T2, T1, T0. The aroma of analog rice showed a real difference in each treatment. This is because the amount of pumpkin concentration in each treatment is different, causing a significant difference in the aroma of analog rice. The aroma produced by analog rice is caused by the composition of the material and the processing of the material. This is consistent with the opinion of [18] which states that the aroma is a combination of taste and odor that occurs due to compounds that exist in the product that evaporates, so that it can cause a distinctive aroma. Yellow pumpkin flour has a caramel aroma and is slightly unpleasant. pumpkin flour also has a very distinctive aroma and different from the aroma of flour or other flour. This is in accordance with the opinion of [17] which states that pumpkin has a very distinctive aroma. the aroma produced is analogous to the distinctive aroma of pumpkin. The more pumpkin flour that is used, the distinctive aroma of pumpkin will be more real and pungent. Supported by the opinion of [16] states that the aroma of food products produced is influenced by the addition of pumpkin flour. Yellow pumpkin flour has a characteristic characteristic of unpleasant scent.

3.9. Texture

Based on the results obtained, it shows the fluctuating analog rice texture value, which means up and down from the T0 - T4 treatment. The texture values obtained from the T0-T4 treatment showed that the analog rice produced had a rather soft texture. According to [15] states that the texture is the appearance in dry food, the tenderness of food, the form of food and the state of food both dry food, alkaline or moist food. The lowest texture value is in the T0 treatment this is due to the T0 treatment in the absence of the addition of pumpkin flour. The T0 treatment had a low texture value, while the highest value was in the T2 treatment with a value of 2.68 having a softer texture compared to the other treatments. The T2 treatment had the best concentration compared to the other treatments, because too many levels of added pumpkin flour concentration showed no significant difference in the texture of analog rice. This is in accordance with the opinion of [14] which states that the lower the amount of adding pumpkin flour to the product produced will make the texture of the product softer, so the more amount of addition of pumpkin flour will make the texture less soft. Supported by the opinion of [12] which states that the addition of high yellow pumpkin causes analog rice to be harder / rougher because the high amylose content gives a hard effect on food. According to [15] states that the quality of sensory qualities assessed for analog rice texture is pulen-pera, sticky-smooth, crunchy-crunchy.

3.10. Taste

Based on the organoleptic test results presented in Table 3, it is known that the highest to the lowest taste intensity is T4, T3, T2, T1, T0. Analog rice which has a slightly sweet taste with the lowest value is in the T0 treatment (without the addition of pumpkin), because the addition of pumpkin in analog rice makes analog rice taste / rice has a distinctive taste of pumpkin and sweet taste in rice. The sweet taste contained in rice is caused by the raw material of manufacture and can also be caused by the cooking process. This is in accordance with the opinion of [13] which states that the sugar content in the pumpkin that has been heated will increase in amount compared to the amount sugar in raw yellow pumpkin. Starch hydrolysis during heating will result in a significant increase in maltose, because the hydrolysis of starch produces dextrin. The results obtained, it is known that the treatments T0 and T1 were significantly different from T2, T3 and T4. This is because the T1 treatment (with the addition of 7.64% pumpkin flour) has the same taste as the T0 treatment (without the addition of pumpkin flour).

This means that the slight increase in the concentration of pumpkin flour does not make a significant difference in the taste of analog rice without the addition of pumpkin, because the resulting flavor is almost the same. The taste obtained in analog rice with the addition of pumpkin has a sweeter taste compared to without the addition of pumpkin, it can be influenced by raw sweet potato and pumpkin containing sugar. This is in accordance with the opinion of [11]) which states the taste of rice is sweeter even though without the addition of sugar, the sweet taste is obtained from yellow sugar cane.

3.11. Adhesiveness

Based on the results in Table 3, shows that the treatment stickiness parameters that have sticky rice appearance are T3 and T4 treatments with stickiness values $3.32 \pm 0.47c$ and $3.48 \pm 0.51c$ (sticky) while those that have slightly sticky values are successively - according to the lowest is in the treatments T0, T1 and T2, the results obtained treatments T0 and T1, T3, T4 are not significantly different from treatment T2. Based on the results obtained, the addition of too much pumpkin concentration indicates that there is no significant difference in the analog stickiness parameters of rice. The best treatment is T3 treatment, because T3 treatment (with the addition of 22.91% pumpkin) experienced significant differences in T0, T1 and T2 treatments but did not experience any significant difference in T4 treatment. Adding too much pumpkin did not experience any significant difference in analog rice adhesiveness. This is consistent with the opinion of [12] which states that the addition of high pumpkin causes analog rice to be harder / coarser so it is not sticky, because pumpkin has a high amylose content which gives a hard effect on food. This is consistent with the opinion of [4] which states that the comparison between amylose and amylopectin can determine the texture, flavor or stickiness of rice, and whether or not rice hardens. The higher the amylose content in rice, the harder and harder the rice produced. Conversely, high levels of rice amylopectin, the fluffier and more sticky rice produced. Supported by the opinion of [10] which states that the comparison between amylose and amylopectin is used as the basis or is a single factor in determining the quality of flavor and texture of rice. The amylose content is positively correlated with the level of softness, adhesiveness, color and gloss.

3.12. Decision

Based on the results obtained in Table 3, it can be seen that the T0 and T1 treatments have a low value of their severity compared to T2, T3 and T4 treatments. The results obtained, the treatment of T2 and T3 has a good score. Whereas for T0, T1, T4 have a rather fluffiness value. This can be caused by the increasing number of pumpkin flours can cause the analog rice to become coarse. So that the best treatment for the parameter of extinction is T2 treatment (with the addition of 15.27% pumpkin flour). The assessment of the parameters of white sweet potato analog rice with the addition of pumpkin is based on the stickiness and hardness parameters owned by the nature of rice, and can be done by tasting and massaging then compared to the original rice sample. This is consistent with the opinion of [7] which states that the tenancy is a combination of adhesiveness and hardness or softness of the rice produced and also the response of good or unpleasant rice which is tasted organoleptically.

The stickiness of rice is tasted based on the texture of the rice being chewed, while the technique is massaged, the rice is said to be fluffier when it is sticky between two fingers and can be said to be pera if it is not attached between the two fingers. The data generated in accordance with Table 2, it is known that the addition of the formulation of pumpkin flour concentration in analog rice which has the highest score of scores is in the T2 and T3 treatments that is $3.04 \pm 0.61b$ and $3.04 \pm 0.54b$ (fluffier). Characteristics of deafness in rice from analog white sweet potato rice with the addition of yellow pumpkin that has been produced when it is still hot or warm has a fluffier texture, but if the rice is left long enough at room temperature in an open state then analog rice will immediately have a hard texture. So it is better to be consumed warm / hot. This is due to the analog processing of rice which is steaming, where a material that contains starch when mixed with water and hot temperatures will cause the gelatinization process. According to [6] The addition of pumpkin causes analog rice to be harder / tougher because of its high amylose content which gives a hard effect on food. The level of

deference favored by each panelist is different, there are likes fluffier and dry rice. Based on SNI 6128: 2015 about rice, the criteria for pera rice texture have amylose content > 25%, fluffier rice has amylose content of 20-25%, very fluffier amylose content of 15 - <20%, while sticky rice (sticky rice) has amylose content by <15%. Purple Uwi analog rice and beetroot are known to have an amylose content > 25% and it can be said that the analog rice produced is included in the pera category.

4. Conclusion

Based on the results of the study, it can be concluded that the higher pumpkin flour formulation and the reduced white sweet potato formulation in analog rice can reduce carbohydrate levels of analog rice products, and can increase ash content, fat content and protein content of analog rice. Organoleptic attributes such as texture cannot be distinguished by panelists. However, on the sensory attributes of the typical aroma of pumpkin on T4 treatment, the best deferential attribute was at T2, while adhesiveness was the best treatment at T3 treatment. The most yellowish brown color in the T4 treatment with white sweet potato flour formulation: mocaf flour: pumpkin flours (22.91: 22.90: 30, 53).

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