

RESEARCH STUDY

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Acceptance Value and Antioxidant Content of Mochi Skin with Substitution of Pumpkin (*Cucurbita Moschata*) and Addition of Ambon Banana (*Musa Paradisiaca* Var. *Sapientum*. L) as a Snack for the Elderly

Nilai Daya Terima dan Kandungan Antioksidan pada Kulit Mochi dengan Substitusi Labu Kuning (*Cucurbita Moschata*) dan Penambahan Pisang Ambon (*Musa Paradisiaca* Var. *Sapientum*. L) sebagai Kudapan untuk Lansia

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ABSTRACT

Background: Elderly have a risk of degenerative diseases such as stroke, hypertension, and coronary heart disease. The elderly experience decreased ability to eat due to physiological changes, development of nutrient-dense snacks is needed to overcome this. Mochi is a semi-moist snack that is well-known to the public. Mochi skin with pumpkin substitution and the addition of ambon banana as a snack that sources natural antioxidants (vitamins A, C) is expected to overcome the problem of degenerative diseases.

Objective: To determine the acceptability value and nutritional content of Mochi skin with pumpkin substitution (*Cucurbita Moschata*) and the addition of ambon banana (*Musa Paradisiaca* Var. *Sapientum*.L).

Methods: This study was a true experimental study with randomized group design, three modified treatments of pumpkin puree substitution with percentages of 30%, 40%, and 50%, and the addition of 50 grams of ambon banana puree in 1 recipe. The acceptance test was done by the hedonic test of preference level by 65 panelists. Results of the preferred formula were then subjected to laboratory tests for the content of vitamins A and C by spectrophotometry. Friedman and Wilcoxon Sign Rank Test was performed to test the hypothesis.

Results: Formula F3 (substitution 50% pumpkin and addition of 50 grams ambon banana) gave good scores on color (3.12), shape (3.12), aroma (3.34), texture (3.28), taste (3.34) and overall (3.34). The nutritional content of F3 /portion (60 grams) based on TKPI was energy 112.42 kcal; protein 1.17 g; carbohydrates 24.38 g; fat 1.28 g; vitamin A 59.99 µg; vitamin C 1.81 mg.

Conclusion: Mochi skin with pumpkin substitute and ambon banana has good acceptability value and increased nutritional content compared to the control formula.

INTRODUCTION

The Elderly is the final period of the human life cycle¹. Based on the Law of the Republic of Indonesia Number 13 of 1998 concerning Welfare, an older adult is someone aged ≥ 60 years. The Elderly is a population at risk (population at risk) with a great chance of experiencing a decline in health in the presence of various risk factors². As we get older, there is a shift in the type of disease, from infectious disease to degenerative disease. The diseases commonly experienced by the elderly are degenerative diseases, including diabetes mellitus, hypertension, coronary heart disease, dementia, sleep disorders, etc.³.

Degenerative diseases can generally occur due to oxidative stress in a person. Oxidative stress is a

condition that can harm health, especially the health of the cardiovascular system, which is associated with high LDL values in a person. High oxidative stress is a factor in the occurrence of hypertension to coronary heart disease, in line with a test conducted on experimental animals, which states that an increase in blood pressure is caused by an increase in oxidative stress in the body⁴. Oxidative stress management can be done by consuming food sources of antioxidants. Antioxidants have many types, and one type of antioxidant is a natural antioxidant. Natural antioxidants are easy to find in foodstuffs, especially plants that can form vitamins E, A, and C, flavonoids, tocopherols, beta-carotene, and α -carotene⁵. Food sources of antioxidants are also beneficial in maintaining health, especially helping the

body's immune system to protect the body from various free radicals that cause various diseases. In the current period or condition, it is essential to maintain the health of the immune system as more and more varied types of free radicals can potentially reduce health in every human group.

Another physiological problem in the elderly is a decreased ability to eat due to changes in functions and components of the digestive tract. Changes in the function and components of the digestive tract in the elderly occur from the loss of teeth to a decrease in the amount of HCL and gastric capacity⁶. Therefore, it is necessary to eat small portions that can meet the minimum nutritional needs of the elderly by making snacks. Mochi cake is a food that originated in Japan and is well-known by the public. Initially, Mochi was known by the name *mua ci*⁷. Mochi belongs to the semi-moist food group, served in a round shape with varying sizes and has a soft yet pliable texture⁸. Mochi is a snack or snack because it is served in small portions or quantities.

Yellow pumpkin (*Cucurbita Maxima*) is a fruit and vegetable commodity with a relatively complete nutritional content including carotene, protein, carbohydrates, multivitamins such as vitamins A, B, and K, and minerals such as calcium, phosphorus, iron, magnesium, and potassium^{9,10}. Pumpkin is stated to be able to help in several conditions of decreased health, such as inflammation, fever, diarrhea, and controlling blood sugar^{11,12}. Bananas are a fruit commodity that is quite common and popular with Indonesians because of their taste and affordable price¹³. The nutritional content of bananas is very diverse, especially in the micro-nutrients of B vitamins (thiamine, riboflavin, niacin, B6, folic acid), vitamin C, calcium, magnesium, iron, zinc, and low cholesterol¹⁴. The two ingredients mentioned are

stated to help maintain human health in the context of the current target, the elderly.

This study aimed to determine the effect of substituting pumpkin (*Cucurbita Moschata*) and adding ambon banana (*Musa Paradisiaca Var. Sapientum. L*) on the acceptability value of Mochi peels as a snack for the elderly. The selection of types of Mochi snacks is intended to create and develop snacks with better nutrition for a wider variety of snacks for the elderly. The results of the acceptability test are expected to provide an overview of the level of preference of the elderly for developed Mochi skin. So, Mochi skin products can be developed as a source of snacks for the elderly with increased nutritional content, especially the natural antioxidant content in Mochi skin.

METHODS

This experimental study applied the treatment concept in substitution and addition. Determination of the essential reference recipe as F0 was considered from the validity test, which stated that the recipe had good sensory value¹⁵. Substitution treatment was carried out on pumpkin (*Cucurbita Moschata*) with glutinous rice flour with a percentage ratio of 30%, 40%, and 50%. This percentage is based on previous research from Rahayu (2017) by considering the organoleptic value of the formula¹⁵. In comparison, the treatment in the form of additions was carried out on the ambon banana (*Musa Paradisiaca Var. Sapientum. L*) with the same amount in each formula. The treatment of pumpkin substitution and the addition of ambon banana was carried out after the ingredients were converted into a puree or fine paste, which was carried out by steaming and grinding. The formula of Mochi skin with pumpkin substitute and adding ambon banana is presented in the following table.

Table 1. Mochi skin formula substitution of pumpkin (*Cucurbita Moschata*) and addition of ambon banana (*Musa Paradisiaca Var. Sapientum. L*) as a snack for the elderly

Material	Information	Treatment			
		F0	F1	F2	F3
Glutinous Flour (g)	Dry, no leaks on the packaging, and not rancid	200	140	120	100
Yellow Pumpkin (g)	There are no wounds on the skin, clean, and not rotten	0	60	80	100
Ambon Banana (g)	There are no disturbing wounds, clean, not too ripe, and not rotten	0	50	50	50
Rice Flour (g)	Dry, no leaks on the packaging, and not rancid	10	10	10	10
Granulated Sugar (g)	Clean, no packaging leaks, and no lumps	75	75	75	75
Butter (g)	The packaging is tightly closed, not rancid, and there are no mushrooms	10	10	10	10

F0: Formula 0; F1: Formula 1; F2: Formula 2; F3: Formula 3; g: gram

In the development stage, the formula was carried out at the location where the researcher lives, which was selected with consideration of being able to maintain food hygiene and safety in terms of the tools used to avoid contamination that may arise during testing to guarantee a sterile environment and homogeneous conditions in each formula made. Meanwhile, the acceptability test was conducted at the nursing home called UPTD Griya Werdha Surabaya, Indonesia, to target elderly panelists. This test has passed the health research ethics test at the Faculty of Public Health, Airlangga

University, with number No: 78/EA/KEPK/2022, as part of the lecturers' research at the Faculty of Public Health, Airlangga University. The selection of test locations was based on the homogeneity of the panelists in the form of eating habits that are commonly consumed. The inclusive indicator of this test was the elderly, who could still communicate with adequate vision and hearing. The number of panelists who were the subjects carried out the organoleptic test in the form of a hedonic test. The place assessment of acceptability tests was to be carried out in a spacious room with good circulation as the

number of panelists is quite large. Tables were arranged as many as 4 test tables, giving the distance between panelists to reduce communication between panelists. Panelists were assisted to ensure that panelists did not experience misunderstandings about the test requirements. Acceptance testing was carried out by assessing the level of preference of the panelists by assessing six organoleptic assessment indicators. The indicators tested were the color, shape, aroma, texture, taste, and overall appearance of the Mochi skin. The test was carried out using the media in the form of filling out an organoleptic test questionnaire, which was measured by rating 4 scales of liking levels: immensely dislike (1), dislike (2), like (3), and really like (4). The purpose of choosing an even scale was to make the panelists express their likes and dislikes clearly without good marks when using an odd scale and to prevent confusion when it is too large. The minimum scale is chosen for this test, where panelists must have one value from each indicator for each formula. Statistical analysis was carried out using SPSS and the Friedman test with a confidence level of 95% ($\alpha = 0.05$), which had an effect if $p \leq 0.05$ and had no effect if $p \geq 0.05$.

The nutritional content of the prepared Mochi skin formula was measured with the help of an Indonesian food composition list (DKBM) using the Nutrisurvey tool. After assessing the acceptability by the panelists, the superior formula was subjected to laboratory tests using the spectrophotometric method at the Laboratory of the Faculty of Public Health, Airlangga University.

Tools and Materials

The tools used in making the Mochi skin formula are digital scales, knives, cutting boards, blenders, stainless containers, basins, steamers, spoons, stirrers, fireplaces, and pans. The ingredients used in making Mochi skin are in Table 1: glutinous rice flour, pumpkin, ambon banana, rice flour, granulated sugar, and butter.

Process of Making Mochi

Making Mochi skin begins with making pumpkin puree and ambon banana puree. The next step is making Mochi skin by mixing the essential ingredients and the puree that had been made. The production of pumpkin puree and ambon banana puree has the same working method: peeling the skin first, then cutting it into smaller sizes and placing it in a heat-resistant container such as a stainless steel container. Next, steam the pumpkin and ambon banana ingredients until they are pretty softened, and after steaming, puree using a blender with the addition of as little water as possible. Add as little water as possible for steamed pumpkin and ambon banana by using stagnant water in the container.

Modified Mochi skin is made by weighing all leather components according to the recipe, considering the substitution ratio, and adding ingredients. Mix all the ingredients thoroughly and cook in a non-stick pan until the dough becomes dense and pliable. After it is cooked, shape the Mochi skin into an oval round and coat it thinly with roasted Flour. The production of controlled Mochi skins has the same method as the production of modified Mochi skins, with the only difference being that pumpkin puree and ambon banana puree are not added. After all the formulas were formed into ovals, the formula was tested on elderly panelists to carry out an acceptability test according to what had been described.

RESULTS AND DISCUSSION

Acceptance Test Results (Hedonic Test)

The modified Mochi skin recipe study has a control recipe based on the Archipelago Cake Jobsheet recipe¹⁵. The difference in this study was the use of pumpkin and ambon banana in each treatment formula so that four formulas were tested and consisted of 1 control and three treatments. The results of the acceptability test in the form of the preference value of the panelists are presented in the graph of the average preference for each indicator as follows:

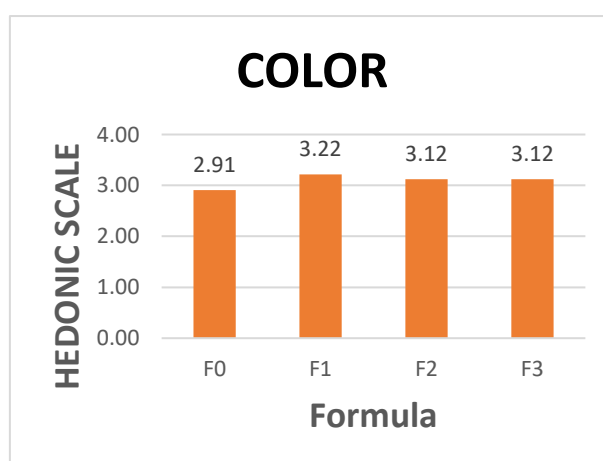


Figure 1. Likelihood level of skin color yellow pumpkin Mochi and ambon banana

Figure 1 is the result of the preference level of the elderly panelists for the color of the Mochi skin

formula tested, both the control formula and the modified formula. This value comes from the average

preference value of consumer panelists after assessing the preference level on a scale of 1 to 4. The scale is described as very dislike (1), dislike (2), like (3), and like very much (4). Based on this rating scale, which is then averaged, it gives the results of the F0 formula (2.91), which, with a value between 2-3, means that the F0 formula tends to be slightly less liked by the panelists. At the same time, the other modified formulas have a value of more than three, which means that the modified formula consisting of formulas F1 (3.22), F2 (3.12), and F3 (3.12) is liked by the panelists.

Color is an indicator that gives a first impression and is very important to determine whether or not a food is accepted by sight¹⁶. Based on the results of the acceptability test on the consumer panelists, the F1 formula has the highest preference value compared to other formulas, which occurs in Figure 1. The F1 formula

has a brownish-yellow color, which can be expressed as a possible high value of the F1 formula because the color is only slightly different compared to the control formula and is considered an exciting variation but not as dark as the other modified formulas. Friedman's statistical test results stated that there was a significant effect of the treatment of the formula on the color indicator with a value of $p=0.007$. Follow-up tests with the Wilcoxon Sign Rank Test found significant differences in the formulas F1-F0 ($p=0.008$) and F2-F0 ($p=0.048$). The color of the formula darkens as the pumpkin puree concentration increases^{17,18}. Ambon banana also cause brown discoloration due to enzymatic reactions, especially the content of polyphenol oxidase enzymes¹⁹. Other ingredients, namely sugar and butter, have an effect by causing a dark color due to interactions between nutrients¹⁷.

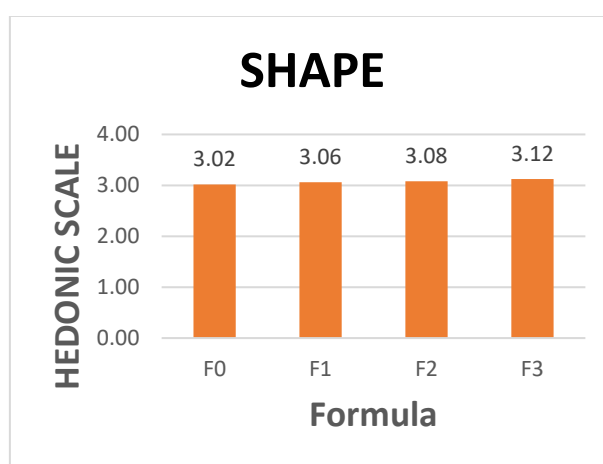


Figure 2. Level of the likeness of yellow pumpkin and ambon banana Mochi skin forms

Figure 2 is the result of the preference level of the elderly panelists for the shape of the Mochi skin formula tested, including the control and modified formulas. This value comes from the average preference value of consumer panelists after assessing the preference level on a scale of 1 to 4. The scale is described as very dislike (1), dislike (2), like (3), and like very much (4). Based on the rating scale that has been averaged, it is stated that all formulas have an excellent preference value with more than a scale value of 3. The control formula, F0 (3.02), as the basic formula, is stated to be exceptionally preferred by the panelists. This finding also happened to the modified formula with a value of more than three, which means that the modified formula consisting of formulas F1 (3.06), F2 (3.08), and F3 (3.12) was liked by the panelists.

The form is a visualization of how a product is given to someone. Assessment of shape is carried out by using visual sensation along with color and other components to stabilize the shape of a product. It can be

done using solid fats, including margarine, to provide a more tender texture²⁰. The results of the consumer panelist acceptance test presented in Figure 2 stated that the F3 formula had the highest preference value compared to other formulas. However, the difference in the values given is not too significant because the shape shown in the test is a round shape similar to the shape of Mochi in general. Friedman's statistical test results stated that there was no significant effect with a value of $p=0.519$ from the treatment of the formula on the form indicator, so the Wilcoxon Sign Rank Test was not carried out as a follow-up test. Mochi has a distinctive physical appearance, which is round and filled with it²¹. Based on this statement, the results of the oval-shaped samples were stated to follow the general shape of Mochi but had several drawbacks. Namely, the resulting shape was less uniform. This finding was based on the increased water content in line with the more significant number of substituted pumpkin.

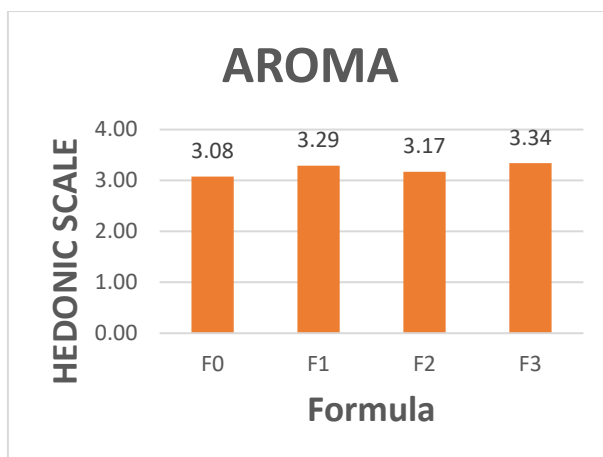


Figure 3. The level of preference for the aroma of yellow pumpkin Mochi and ambon banana

Figure 3 shows the preference level of the elderly panelists for the aroma of the tested Mochi skin formula consisting of a control formula and a modified formula. This value comes from the average preference value of consumer panelists after assessing the preference level on a scale of 1 to 4. The scale is described as very dislike (1), dislike (2), like (3), and like very much (4). Based on the average rating scale, the results of all formulas have an excellent preference value with more than a scale value of 3. Formula F0 (3.08), as a control formula, has a preference value that the panelists quite like. The same thing happened to the modified formula with a value of more than three, which means that the modified formula consisting of formulas F1 (3.29), F2 (3.17), and F3 (3.34) was liked by the panelists.

Aroma is a sensory indicator originating from vapors caused by food processing and the influence of food ingredients and processing techniques, so it is said that aroma plays an essential role in assessing eating preferences by influencing food odors¹⁶. The results of

the acceptability test on the consumer panelists presented in Figure 3 showed that the F3 formula had the highest preference value compared to the other formulas. This finding was because the aroma produced by the formula became more aromatic due to the addition of pumpkin and ambon banana. Friedman's statistical test results stated a significant effect from the formula treatment, especially the aroma, with a $p=0.002$. Follow-up tests with the Wilcoxon Sign Rank Test found significant differences in the formulas F1-F0 ($p=0.007$), F3-F0 ($p=0.004$), and F3-F2 ($p=0.044$). The aroma of the modified Mochi skin is more aromatic and fruity, especially pumpkin and ambon banana. Adding pumpkin causes an unpleasant aroma due to the presence of flavonoids in pumpkin¹⁸. In comparison, adding ripe bananas provides aromatic compounds and makes the aroma of food more fragrant¹⁹. So mixing the two ingredients can help reduce the unpleasant smell of pumpkin and result in a more aromatic aroma that the panelists like.

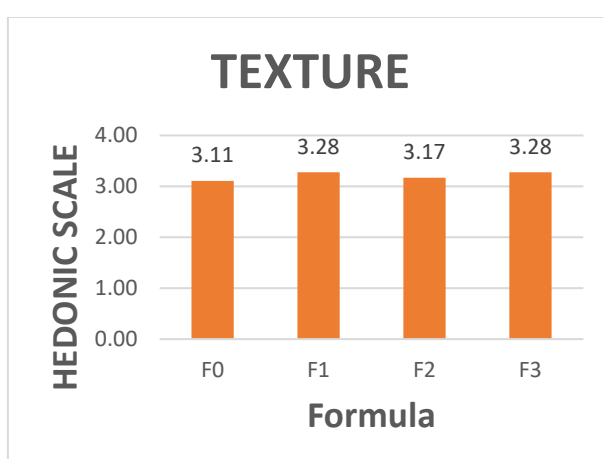


Figure 4. Level of the likeness of Mochi pumpkin and ambon banana skin texture

Figure 4 presents the preference level of elderly panelists for the texture of the tested Mochi skin formula consisting of a control formula and a modified formula. This value comes from the average preference value of

the consumer panelists after assessing the level of preference on a scale of 1 to 4. The scale describes the level of preference to dislike very (1), dislike (2), like (3), and like very much (4). The results of the average rating

scale show that all formulas have an excellent preference value with more than a scale value of 3. The control formula F0 (3.11) has a preference value that is quite liked by the panelists, even though it is described as giving a texture that may be uncomfortable. In the modified formula, the same conditions occur with the average preference value being more than 3, which means that the modified formula consisting of formulas F1 (3.28), F2 (3.17), and F3 (3.28) is favored by the panelist. Of the three modified formulas, formulas F1 and F3 have the same average preference value with the interpretation of the value as the formula the panelists prefer.

The texture is a sensory evaluation element with complex properties and has a material structure consisting of three components: mechanical (hardness and elasticity), geometry (gritty and crumbly), and mouthfeel (oily and watery)²². The results of the acceptability test on the consumer panelists in Figure 4 show that formulas F1 and F3 have the highest acceptability values compared to other formulas, and the difference in values between F1 and F3 is not too

significant. The panelists quite liked the F1 formula because the texture of F1 was not much different from the control formula. In contrast, the panelists liked the F3 formula because the resulting texture was comfortable enough to be consumed, even though it was pretty different from the control formula. Friedman's statistical test results stated that there was no significant effect with a value of $p=0.328$ from the treatment of the formula on the texture indicator, so the Wilcoxon Sign Rank Test was not carried out as a follow-up test. The texture produced by the control formula is very chewy with a dense tendency, while the modified formula has a chewy but soft texture, so it can be said that Mochi skin is easy to consume. Pumpkin has good gelatinization properties, producing dough with reasonable consistency, elasticity, viscosity, and elasticity¹⁷. It can affect the texture of the Mochi skin, which is more supple. The banana component has a high water content, so the texture of the food becomes wetter, which can make the texture of the Mochi skin too soft.

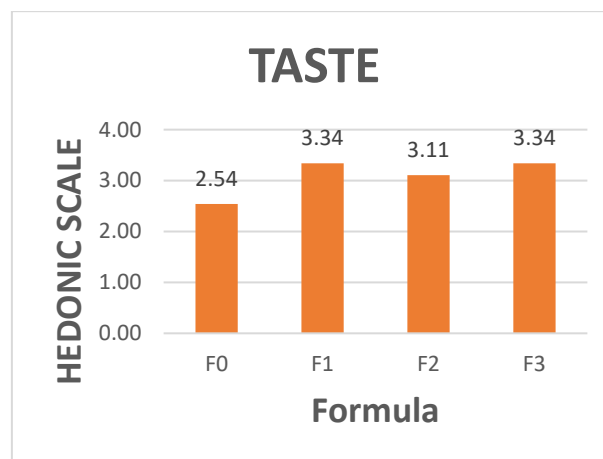


Figure 5. The flavor level of yellow pumpkin Mochi skin and ambon banana

Figure 5 shows the preference level of the elderly panelists for the taste of the tested Mochi skin formula, which consists of a control formula and a modified formula. This value comes from the average preference value of consumer panelists after assessing the preference level on a scale of 1 to 4. The preference scale is described as very dislike (1), dislike (2), like (3), and like very much (4). Based on this rating scale, which is then averaged, it gives the results of the F0 formula (2.54), which, with a value between 2-3, means that the F0 formula tends to be slightly less liked by the panelists. In comparison, the other modified formulas have a value of more than 3, which means that the modified formula consisting of formulas F1 (3.34), F2 (3.11), and F3 (3.34) is liked by the panelists.

Taste is an essential indicator in evaluating a portion of food and determines whether a food should be chosen based on the taste it produces. However, each individual has a different sensitivity or preference for a particular taste²². The results of the acceptability test on

consumer panelists in Figure 5 illustrate that formulas F1 and F3 have the highest preference values compared to other formulas. The F1 formula was quite popular with the panelists, probably because the resulting taste differed significantly from the control formula. At the same time, the F3 was quite popular because the more pungent fruit taste was accepted. After all, the novelty gave a better taste. Friedman's statistical test results stated a significant effect from the treatment of the formula, which was superior to flavor, with a $p<0.001$. Follow-up tests with the Wilcoxon Sign Rank Test found significant differences in the formulas F1-F0 ($p<0.001$), F2-F0 ($p<0.001$), and F3-F0 ($p<0.001$). The taste produced by the modified formula tends to be more aromatic with a sweet, fruity taste¹⁷. The addition of bananas also causes a sweeter taste due to changes in simple sugars during ripening¹⁹, so it can be stated that the presence of pumpkin substitution and the addition of ambon banana influences the taste the panelists favor.

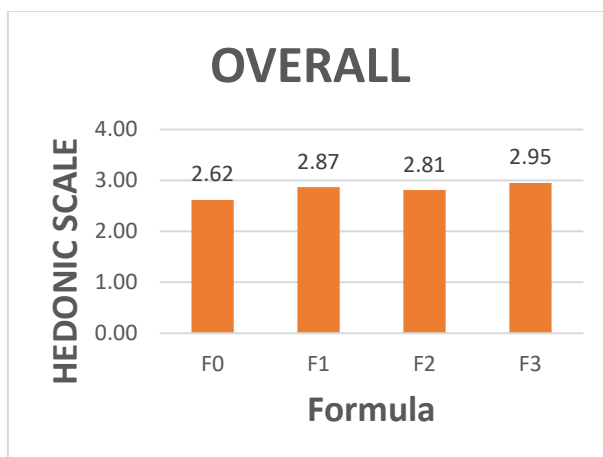


Figure 6. Overall likeability of yellow pumpkin and ambon banana Mochi skins

Figure 6 is the overall result of the preference level of elderly panelists for the Mochi skin formula, which consists of a control and modified formula. Overall indicators require panelists to assess Mochi skin by considering other indicators simultaneously, namely color, shape, aroma, texture, and taste. The preference value comes from the average preference value of the consumer panelists after assessing the level of preference on a scale of 1 to 4. The preference scale is described as very dislike (1), dislike (2), like (3), and like very much (4). Based on the rating scale, which is then averaged, it shows that all formulas have a value less than a scale of 3. Formula F0 (2.62) as a control formula with a value between 2-3 means that formula F0 tends to be slightly less liked by the panelists. The modified formula also has a value between 2-3 but is closer to a value of 3, meaning it is relatively more popular than the F0 formula. The modified formula consists of formulas F1 (2.87), F2

(2.84), and F3 (2.95). Of the three types of modified formulas, the F3 formula became the formula with the highest average preference compared to the other formulas, which meant that the F3 formula was preferred by the panelists even though it was not optimal.

The overall assessment of Mochi skin aimed to provide a complete picture of the preferences of panelists with the perspective of Mochi skin as a whole by not assessing each indicator separately. However, in practice, it is carried out while still considering all organoleptic components in color, shape, aroma, texture, and taste. The formula with the highest overall acceptability value is F3, with a total average of 2.95. The results of Friedman's statistical test showed a significant effect of the treatment on the formula with a value of $p < 0.001$. Follow-up tests with the Wilcoxon Sign Rank Test found significant differences in the formulas F1-F0 ($p < 0.001$), F2-F0 ($p = 0.001$), and F3-F0 ($p < 0.001$).

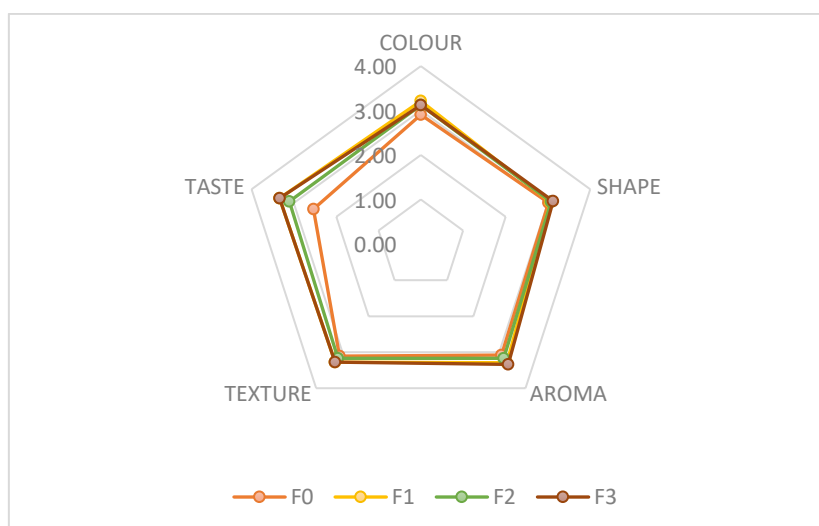


Figure 7. Graph of comparison of panelists' favorability of formulas

Statistical testing on organoleptic indicators showed that there were indicators that had a significant influence and did not have a significant effect. The results

of the significance test were carried out by the Friedman test and followed by the Wilcoxon Sign Rank Test. The results of the Friedman test gave the results of

organoleptic indicators, which showed significance, namely color (p=0.007), aroma (p=0.002), taste (p<0.001), and overall (p<0.001). The significant results

indicators are then tested with the Wilcoxon Sign Rank Test.

Table 2. Comparison of the significant value of each indicator between the Mochi skin formula substitution of pumpkin (*Cucurbita Moschata*) and the addition of ambon banana (*Musa Paradisiaca Var. Sapientum. L*) as a snack for the elderly

Indicator		F0	F1	F2	F3
Color	F0	-	0.008*	0.048*	0.114
	F1	0.008*	-	0.180	0.216
	F2	0.048*	0.180	-	1.000
	F3	0.114	0.216	1,000	-
Aroma	F0	-	0.007*	0.180	0.004*
	F1	0.007*	-	0.059	0.549
	F2	0.180	0.059	-	0.044*
	F3	0.004*	0.549	0.044*	-
Flavor	F0	-	<0.001*	<0.001*	<0.001*
	F1	<0.001*	-	0.080	0.980
	F2	<0.001*	0.080	-	0.091
	F3	<0.001*	0.980	0.091	-
Whole	F0	-	<0.001*	0.001*	<0.001*
	F1	<0.001*	-	0.144	0.874
	F2	0.001*	0.144	-	0.096
	F3	<0.001*	0.874	0.096	-

Friedman test; *) Significant if p-value <0.05; F0: Formula 0; F1: Formula 1; F2: Formula 2; F3: Formula 3

Nutrient Content

Natural antioxidants, nutritional content in the form of vitamin A and vitamin C as components contained in the main ingredients of the Mochi skin formula in units

of each portion weighing 60 grams of Mochi skin. Calculations using the Indonesian Food Composition Table (TKPI) were presented in the following table.

Table 3. Nutritional content per portion (60 grams) of Mochi skin formula substitution of pumpkin (*Cucurbita Moschata*) and addition of ambon banana (*Musa Paradisiaca Var. Sapientum. L*) as a snack for the elderly

Nutritional Substances	F0	F1	F2	F3
Energy (kcal)	111.91	129.59	121.01	112.42
Proteins (g)	1.41	1.48	1.33	1.17
Carbs (g)	24.19	28.15	26.27	24.38
Fat (g)	1.20	1.20	1.20	1.20
Vit. A (µg)	9.36	39.94	49.96	59.99
Vit. C (mg)	0.00	1.31	1.56	1.81

g: gram; kcal: kilo calorie; µg: micro gram; mg: milli gram; F0: Formula 0; F1: Formula 1; F2: Formula 2; F3: Formula 3

Based on the results of these calculations, it was stated that the minimum addition of pumpkin and ambon banana to the F1 formula increased the natural antioxidant content in the form of vitamin A and vitamin C, which was higher in the F3 formula. Formula F3, as the superior formula, compares glutinous rice flour and pumpkin in a percentage of 50%:50%, giving the maximum nutritional content value, and is quite good compared to other formulas related to adding pumpkin and banana components to the formula.

Formula F3 has a higher nutritional content value when compared to F0 for macronutrients in energy and carbohydrates, with a very minimal difference. The macronutrient with a relatively low content value is protein, while fat has the same value as the source of fat used is the same. Furthermore, the F3 formula, as the superior formula, was tested in the laboratory to determine vitamin A and C content.

Table 4. Table of laboratory test results for the content of vitamins A and C formula 3 per 60 grams (1 portion) of Mochi skin formula substitution of pumpkin (*Cucurbita Moschata*) and addition of ambon banana (*Musa Paradisiaca* Var. *Sapientum*. L) as a snack for the elderly

Nutritional Substances	Unit	Laboratory Test Results
Vit. A	µg	768
Vit. C	mg	2,274

µg: micro gram; mg: milli gram

This research received a positive response from the elderly panelists because they could taste new foods. The type of formula given provided an increase in nutritional content, especially the natural antioxidant content in the form of vitamin A and vitamin C. Additional materials used so that better storage techniques are needed to increase the shelf life of this product.

CONCLUSIONS

The formula for pumpkin Mochi skin with pumpkin substitution and the addition of ambon banana was declared feasible for further development along with the results of the acceptability test, which gave positive results. The F3 formula is the most preferred formula by consumer panelists based on the results of acceptability tests on color indicators (3.12), shape (3.12), aroma (3.34), texture (3.28), taste (3.34) and overall (3.34). The nutritional content of the F3 formula in one portion (60 grams) based on calculations using TKPI is 112.42 kcal of energy; protein of 1.17 g; carbohydrate fat of 24.38 g; fat by 1.28 g; vitamin A of 59.99 µg; and vitamin C of 1.81 mg.

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Conflict of Interest and Funding Disclosure

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