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Organoleptic Quality Characterization of Cookies with Eggshell, Kepok Banana Flour, Arrowroot Starch

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Abstract

The aim of this research is to study the effect of adding egg shell flour on the panelists' level of preference for kukis substituted for kepok banana flour and arrowroot starch. This research used a Completely Randomized Design (CRD), with treatments consisting of differences in the composition of the addition of egg shell flour (10%, 15%, and 20%), and the proportion of arrowroot starch: kepok banana flour (100%: 0%, 50%: 50%, 0%:100%). The research results showed that the product with the highest average color preference was F2 with ingredients of 15% egg shell flour, 85% arrowroot starch. The product with the highest average preference for aroma, taste and texture is F3 with ingredients of 20% egg shell flour, 80% arrowroot starch. The cookies made from eggshell flour that were most liked by the panelists from all hedonic aspects (texture, taste, color and aroma) were cookies with a proportion of 80% arrowroot starch, 0% kepok banana flour and the addition of 20% eggshell flour (F3). with an average color preference of 4.13 (like), aroma of 4.05 (like), taste of 4.13 (like), and texture of 4.03 (like).

Introduction

Cookies are a type of snack favored by Indonesians. Based on BPS data (2018), the average per capita consumption of cookies, such as cookies, in 2018 was 22,824 kg. According to the SNI 2973:2011 standard, cookies are classified as a type of biscuit made from soft dough, featuring a crunchy texture, and showing a relatively loose cross-section when broken. In general, cookie quality includes properties such as dryness, a crunchy and brittle texture, a distinctive and fragrant aroma, a delicious, savory, and sweet taste, and a color that tends to range from yellow to brown (depending on the ingredients used). Cookies can be stored for 3-6 months (Faridah et al., 2008).

Eggshells, a rich source of calcium, have not been fully utilized and have been considered waste. Data on per capita weekly chicken egg consumption in 2018 reached 2,152 kg (BPS, 2018a). A study by Rahma Wati and Nisa (2015) showed that eggshell waste has the potential to cause environmental pollution through microbial activity. The main composition of eggshells, specifically calcium carbonate ($CaCO_3$), a commonly used calcium salt, shows that 40% of its components are easily absorbed. Ali and Badawy (2017) showed that each eggshell contains approximately 108 mg/g of calcium. A study by Brun et al. (2013) suggested that processing eggshells into flour and adding them to products such as pizza, bread, spaghetti, and other baked goods is an effective method, as it only slightly changes the texture without altering the taste. Hassan's (2015) research confirmed that increasing eggshell flour supplementation can result in a stronger fishy aroma and higher nutritional value, although consumer preference can be negatively affected. To reduce the fishy aroma, adding other ingredients, such as bananas, may be an effective solution, according to these findings (Giuggioli et al., 2024; Kumar et al., 2025; Auriema et al., 2022).

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Kepok banana is a local food ingredient that is easily available and has the potential to substitute the use of wheat flour, and is high in fiber (Kaleka, 2013). The high starch content forms a consistency in cookies so that it can replace the role of wheat flour (Agustine, 2015). According to the Indonesian Food Composition Table (Ministry of Health of the Republic of Indonesia, 2018), kepok banana contains 5.7 g/100 g of fiber and 10 mg/100 g of calcium, making it suitable as a cookie formulation ingredient. Sambona (2018) showed that the substitution of kepok banana flour in biscuits had a significant effect of 17.22% on the total dietary fiber content.

In recent years, the understanding of sensory (hedonic) has been increasingly recognized in consumer research and chemosensory neuroscience, resulting in increased interest in research in the hedonic domain (Dikecligil & Gottfried, 2022; Lee, 2025). Sambona (2018) presented evidence that banana flour proportions of 30%, 40%, and 50% significantly affected the hedonic quality of biscuits. The higher the banana flour addition, the lower the assessment of hedonic quality characteristics. The replacement of banana flour at 40% was found to be well-accepted by panelists. Another finding from Hassan (2015) showed that there was no significant difference in the hedonic characteristics of color between control biscuits and biscuits supplemented with eggshell flour at levels of 3%, 6%, and 9%. Supplementation at a level of 6% was found to be well-accepted by panelists.

In addition to kepok bananas, arrowroot starch can be used as a substitute for wheat flour up to 50-100% (Djaafar & Rahayu, 2006). Arrowroot starch has a very fine texture and is easily digested due to its higher amylose and amylopectin content. The extraction process of arrowroot tubers produces arrowroot starch with a fibrous texture and white color. Therefore, arrowroot starch has the potential to replace wheat flour. The special properties of arrowroot starch as a substitute for wheat flour can provide a crunchy character to several types of cakes that are cooked by frying or baking (Kumalasari & Adisty, 2024; Khotimah et al., 2026).

The use of chicken eggshell flour, kepok banana flour, and arrowroot starch in cookie formulation is expected to not only reduce dependence on wheat flour but also increase the nutritional value of cookie products. Based on the previous explanation, this study investigated the impact of adding chicken eggshell flour and substituting kepok banana flour and arrowroot starch on sensory evaluation of cookies.

Methods

The ingredients used to make eggshell cookies are arrowroot starch, kepok banana flour, and eggshell flour. Other ingredients include margarine, powdered sugar, powdered milk, egg yolks, instant coconut milk, baking powder, and vanilla.

Making eggshell cookies is divided into three stages, namely the first mixing the dry ingredients, mixing the wet ingredients, and mixing the dry ingredients into the wet ingredients. In the first stage, dry ingredients such as arrowroot starch, kepok banana flour, eggshell flour, powdered milk, baking powder, and vanilla are mixed first using a spatula. In another container, margarine is mixed with powdered sugar and beaten using a whisk until a slightly pale yellow color. Then, egg yolks and instant coconut milk are added to the wet ingredients. The final stage is to mix the dry ingredients into the wet ingredients little by little until the dough becomes smooth. Next, the dough that has been smooth, weighed with a uniform size and molded, and placed on a baking sheet that has been lined with baking paper. The dough is baked at a temperature of 175 o C for 20 minutes. After 10 minutes of baking, the position of the baking sheet must be flipped to prevent the cookies from burning.

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The organoleptic test includes two types: hedonic testing and hedonic quality testing. The organoleptic parameters evaluated include color, aroma, taste, and texture of the eggshell cookies. The organoleptic assessment was conducted to determine the eggshell cookie formulation most preferred by the panelists. The test involved 40 panelists who had no prior training. The rating scale used in the hedonic test was 1 = dislike very much, 2 = dislike, 3 = moderate (somewhat like), 4 = like, and 5 = like very much.

This research design is a Completely Randomized Design (CRD), with treatments in the form of different compositions of eggshell flour, arrowroot starch, and kepok banana flour. Eggshell flour was added at 10%, 15%, and 20% of the total flour used, while arrowroot starch and kepok banana flour were added in the following proportions 100% arrowroot starch : 0% kepok banana flour, 50% arrowroot starch : 50% kepok banana flour and 0% arrowroot starch : 100% kepok banana flour. This formulation was obtained based on preliminary research that has been conducted. The following is the formulation used in this study:

Table 1. Research Formulation

Code	Adding Flour			Total Flour
	Eggshell Flour	Arrowroot Starch	Kepok Banana Flour	
F1	10%	90%	-	100%
F2	15%	85%	-	100%
F3	20%	80%	-	100%
F4	10%	45%	45%	100%
F5	15%	42.5%	42.5%	100%
F6	20%	40%	40%	100%
F7	10%	-	90%	100%
F8	15%	-	85%	100%
F9	20%	-	80%	100%

The data analysis in this study was derived from panelists' assessments of eggshell cookies in terms of organoleptic aspects. The collected data were tested for normality and homogeneity. The test results showed that the data did not have a normal distribution and were not homogeneous. Therefore, data analysis was carried out non-parametrically using the Kruskal-Wallis test, followed by the Mann-Whitney test with a 95% confidence level ($\alpha = 0.05$). The effectiveness test method (De Garmo, 1984) was used to determine the best treatment based on the calculation of effective values through weighting.

Results and Discussion

Table 2. Results of the Hedonic Organoleptic Assessment of Cookies

Code	Hedonic Organoleptic (Mean±SD)			
	Color	Aroma	Flavor	Texture
F1	3.90±1.06 ^{a}	3.65±0.86 ^{ab}	3.95±0.85 ^{a}	4.03±0.92 ^{a}
F2	4.18±0.78 ^{a}	3.80±0.85 ^{ac}	3.85±0.98 ^{ab}	3.90±0.84 ^{ab}
F3	4.13±0.91 ^{a}	4.05±0.68 ^{c}	4.13±0.88 ^{a}	4.03±1.03 ^{a}
F4	2.95±0.99 ^{b}	2.63±1.01 ^{d}	2.55±0.99 ^{c}	2.18±0.93 ^{c}
F5	3.00±1.06 ^{bc}	2.90±0.96 ^{de}	2.85±0.98 ^{cd}	2.28±0.96 ^{c}
F6	3.35±0.89 ^{c}	3.28±0.88 ^{before}	3.48±0.96 ^{be}	3.30±1.07 ^{d}
F7	3.38±0.84 ^{c}	3.28±0.88 ^{be}	3.48±0.88 ^{bf}	3.78±0.89 ^{abe}
F8	3.20±0.88 ^{bc}	2.90±0.90 ^{df}	3.25±0.90 ^{def}	3.55±0.93 ^{bd}

ISSN 2721-1304 (Print), ISSN 2721-1207 (online)

F9	3.25±0.93 [bc]	3.43±0.90 [ab]	3.15±0.83 [de]	3.40±1.08 [de]

Notes:

1 = dislike very much, 2 = dislike, 3 = moderate, 4 = like, 5 = like very much

a,b = similar letter notation indicates no significant difference in the Mann-Whitney test with a 95% confidence level

Color

The results of the organoleptic test of the color aspect of the cookie product are in the range of the moderate and like group. This indicates that the color of the new formula cookie is still within the normal limits of being attractive for consumption. The brownish white cookie for the formula consisting of eggshell flour and arrowroot starch, becomes darker brown when added with kepok banana flour. The results of the statistical test showed no significant difference in the level of panelists' preference in the color aspect of products F1, F2, F3, and F4, F5, F8, F9. However, the highest average color preference was in F2. Products F1, F2, F3 did not differ statistically significantly in color preferences by panelists, and these products have a composition of only eggshell flour and arrowroot starch, without the addition of kepok banana flour. This affects the appearance of brighter colors so that they are preferred by panelists.

The color of a product is determined by the color of its ingredients. If the composition of the ingredients has significantly different color gradations, then the proportion of the ingredients will determine the color of the resulting product. For example, in the study of Novidahlia et al. (2015) on making cookies with arrowroot starch and rice flour did not show a significant level of preference between the formulas. This is because arrowroot starch and rice flour have almost the same color, namely both bright. This is different when the cookie ingredients used are arrowroot starch and pumpkin flour, where the two flours have very significant color differences. Arrowroot starch has a bright white color while pumpkin flour is yellow because it contains a lot of carotenoid pigments. There was a significant difference between the formulas in the organoleptic test of the color aspect. The highest average color preference of the panelists was for the formula with arrowroot starch dominant and very little pumpkin flour added (Noviati and Purwani, 2017). This is because when the two ingredients are mixed, it will produce a product with a brownish yellow color which will increase if the pumpkin flour substitution is increased.

Cookie products in this study, when classified according to the number of ingredients, are divided into groups with eggshell flour and arrowroot starch as products F1, F2, and F3; groups with eggshell flour, arrowroot starch, and kepok banana flour as products F4, F5, and F6; and groups with eggshell flour and kepok banana flour as products F7, F8, and F9. Based on the average color preference score, products with eggshell flour and arrowroot starch are preferred over other groups, as evidenced by the spider web graph in Figure 1 below. F, F2, and F3 have the furthest points from the center point.

The chicken eggshell flour used in this study is light brown in color, due to the type of chicken eggs used being non-breed laying hens, which generally have brown eggshells. The light brown color of the eggshell is caused by the protoporphyrin IX pigment, just as iron gives hemoglobin its red color. All eggshells are made from the same material, calcium carbonate, while the color is influenced by the chicken breed (Raabus , 2018). Meanwhile, the kepok banana flour is dark brown because it has undergone processing from the original white kepok banana fruit. This processing causes the Maillard reaction, which turns the flour brown. The Maillard reaction is

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a reaction between amino acids and reducing sugars. The presence of fiber and phenolic compounds makes the brown color due to the Maillard reaction even darker (Nairfana and Rizaldi, 2022; Permatasari et al., 2020).

Aroma

The results of organoleptic tests on the aroma aspect of cookie products involving the use of eggshell flour, arrowroot starch, and kepok banana flour showed that the average value was in the dislike-moderate and moderate-like categories. The lowest average value was found in product formulation F4 (10% eggshell flour, 45% arrowroot starch, 45% kepok banana flour), while the formulation with the highest average value was F3 (20% eggshell flour, 80% arrowroot starch, 0% kepok banana flour). Spider graph analysis of the hedonic organoleptic assessment of aroma, as depicted in Figure 2, shows products with the highest and lowest levels of liking by considering the closest and furthest points from the center of the graph. However, statistically, the results of the organoleptic aroma test showed no significant difference in the level of panelists' preference for products F1, F2, F9, and F5, F6, F7. Although the highest average preference was found in product F3, there was no significant difference with F2. On the other hand, product F6 received panelists' preference comparable to product F7, although both (F6 and F7) used the addition of kepok banana flour , the level of preference for both was still below the formula without the addition of kepok banana flour (F1, F2, and F3). In line with this finding, panelists tended to prefer products with a composition of eggshell flour and arrowroot starch without the addition of kepok banana flour.

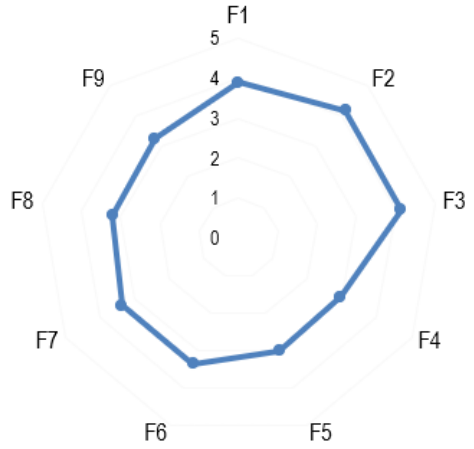

Figure 1. Spider Graph of Hedonic Organoleptic Assessment of Color

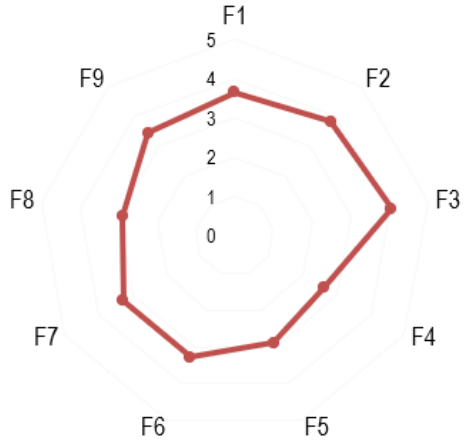

Figure 2. Spider Graph of Hedonic Aroma Organoleptic Assessment

In general, there was a tendency for panelists to increase their preference for aroma as the percentage of eggshell flour added to the cookies increased, although the difference was not statistically significant. The results of this study are consistent with the findings of previous studies exploring the influence of eggshell flour on cookie preparation . Karasi cake made from red rice flour and eggshell flour was tested for organoleptic and calcium content. Observations from this study showed that increasing the concentration of eggshell flour in karasi cake resulted in an improvement in aroma assessment. This was due to the distinctive aroma of eggshell flour , which was preferred by the panelists (Ardin et al., 2019).

The distinctive aroma in cookie dough comes from ingredients such as margarine, milk, and eggs influenced by the cooking process by baking, where the evaporation process from the

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dough results in a reduction in water content (Bhatawale et al., 2012). The distinctive aroma produced by arrowroot starch flour during the baking process is related to the Maillard reaction that reduces the fishy level of eggshell flour. Baking involves the Maillard reaction that produces the distinctive aroma of cookies that is liked, because gelatinized starch during baking produces volatile carbon compounds and carbonyl due to the breaking of carbon bonds (Dri et al., 2011). The fat contained in butter acts as an aroma booster, so the presence of butter can mask the aroma that comes from banana flour and eggshell flour (Singh et al., 2008).

The addition of kepok banana flour to the cookie formulation, as observed in this study, showed a tendency for panelists to decrease their preference for aroma. This finding is consistent with the results of Azizah and Adianti's (2019) study involving the production of cat's tongue cookies using kepok banana flour, which showed that panelists rated the aroma of the cat's tongue cookies lower with this treatment. The resulting cat's tongue cookies exhibited a less desirable characteristic in the form of a distinctive aroma, primarily driven by the kepok banana flour used. The aroma of bananas is chemically the result of volatile components recognized by alpha-factory receptors (Setyadi, 2016). The emergence of a strong odor can be triggered by enzymatic or non-enzymatic browning reactions during the product processing process. In addition, the aroma of the resulting product can be influenced by protein content. During heating, proteins in food ingredients undergo modification and cause compounds with other ingredients to form, such as amino acids, formed from the interaction of reducing sugars with proteins, and this then contributes to the aroma of the product (Azizah and Adianti, 2019).

Flavor

The results of the organoleptic test of the taste aspect showed that the cookie products made from eggshell flour, arrowroot starch, and kepok banana flour in this study had an average value that was classified as dislike-moderate and moderate-like. The lowest average value was found in product F4 (10% eggshell flour, 45% arrowroot starch, 45% kepok banana flour), while the highest average was found in product F3 (20% eggshell flour, 80% arrowroot starch, 0% kepok banana flour). Products with the highest and lowest levels of liking can be seen in Figure 3 Spider graph of the hedonic organoleptic assessment of taste by looking at the points closest and farthest from the center of the graph. However, statistically the results of the organoleptic test of the taste aspect showed no significant difference in panelists' preferences for products F1, F2, F3 and F6, F7. The highest average preference was indeed found in product F3, but product F3 was not significantly different from F1 and F2. Meanwhile, product F6 was liked by panelists with the same preference as product F7. Both products (F6 and F7) used the addition of kepok banana flour, but their preference ratings were still below those of the formulas without the addition of kepok banana flour (F1, F2, and F3). Panelists preferred the product with the eggshell flour and arrowroot starch composition without the addition of kepok banana flour.

Eggshell flour-based products have a distinctive, slightly gritty taste. This is due to the high calcium carbonate content, which is the main component of eggshells. Despite undergoing several processing stages in the flouring process, the gritty taste persists. This taste can be masked if only a small amount of eggshell flour is added during the product's manufacture or if the product is produced wet without undergoing a drying process. The results of a study on tapioca crackers fortified with chicken eggshell flour by Aprillita et al. (2018) stated that the taste of the crackers was still preferred by panelists despite being gritty. Converse results were obtained by Rahmawati and Nisa (2015) and Suryati et al. (2019) in their study on the addition of chicken eggshell flour to cookies, where the higher the percentage of eggshell flour added,

ISSN 2721-1304 (Print), ISSN 2721-1207 (online)

the less favored the cookie taste was. In a study by Asviani and Ninsix (2017), the addition of eggshell flour did not affect the panelists level of taste preference for the resulting wet noodle.

The use of arrowroot starch in making eggshell flour cookies can help improve the taste of the resulting cookie product. Several studies have shown that products made with arrowroot starch and the addition of various other flours have a high average preference when arrowroot starch is used in sufficient quantities such as 30% or even 100% (Novidahlia et al., 2015; Noviati and Purwani, 2017). Arrowroot starch has a more acceptable taste to the tongue because it is smooth and has no aftertaste compared to eggshell flour.

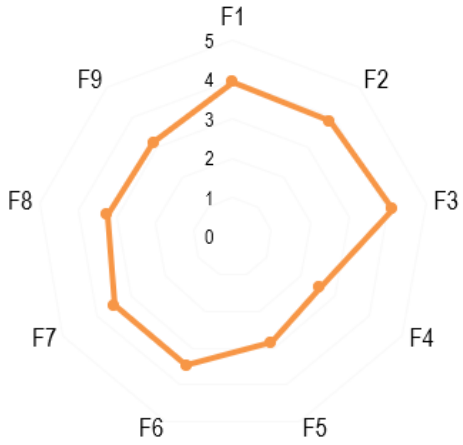

Figure 3. Spider Graph of Hedonic Taste Organoleptic Assessment

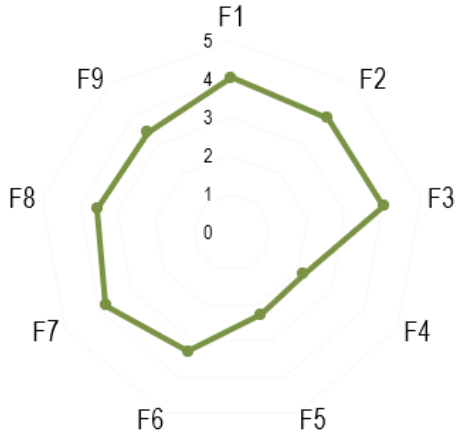

Figure 4. Spider Graph of Hedonic Texture Organoleptic Assessment

The addition of kepok banana flour to the cookie formula in this study showed a trend of decreasing the panelists taste preference. This is likely due to the distinctive banana flavor and slight bitterness due to the phenolic compounds it contains. Kepok banana flour contains quite a lot of phenolic compounds, as evidenced by the ease with which bananas brown upon contact with air. When ground into flour, kepok banana flour has a darker brown color than when it is still fresh because it undergoes the Maillard reaction and contains quite a lot of phenolic compounds (Nairfana and Rizaldi, 2022; Permatasari et al., 2020). The results of Anwar and Kritiastuti's (2019) study on making butter cookies from kepok banana flour and arrowroot flour showed that increasing the proportion of kepok banana flour decreased the taste and overall preference level of the resulting product.

Texture

Based on the results of the Kruskal-Wallis analysis, the p value <0.05 was shown, so it can be concluded that the variation in the addition of eggshell flour, arrowroot starch, and kepok banana flour affected the panelists' level of preference for cookie texture. The spider graph shows that F1, F2, and F3 are at the same point and the farthest, namely in the area of point four. Then table 4 also shows that F1, F2, and F3 have the same subset, which means they do not show any significant differences. However, the highest assessment was shown in F1 and F3 with a value of 4.03 (like), then followed by F2 with a value of 3.90 (moderate or half like).

The percentage of eggshell flour added did not affect the panelists' preference for the cookie texture. This can be seen from F1, F2, and F3, although the amount of eggshell flour added was different, but the results of the statistical analysis did not show a significant difference. The addition of kepok banana flour decreased the panelists' level of preference for the cookie

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texture. This is in line with Nuraeni et al. (2022) who showed that panelists preferred the cookie texture most with the addition of eggshell flour at both the smallest (3%) and the largest (9%) percentages and with the addition of kepok banana flour the least.

The most preferred cookie texture is one that is easy to break, due to the influence of fat and amylose content. The presence of fat is what will produce cookies with a crunchy texture (Oktaviana et al., 2017). Cookies with a texture that is not too hard have a high level of preference (Kifayah and Basori, 2015). In this study, the type and amount of fat added to all formulations were the same. The type of fat used was margarine with an addition of 50% of the total flour.

Besides being influenced by fat, cookie texture is also influenced by the amylose content of the ingredients used, in this case arrowroot starch. The higher the amylose content in the starch, the higher the texture hardness value of the biscuit (Indrianti et al., 2021). Arrowroot starch contains 24.64% amylose (Faridah et al., 2014). Research by Indrianti et al. (2021) showed that biscuits added with arrowroot starch had a texture with a higher hardness value than biscuits added with potato and corn starch, but still lower than those added with tapioca.

This study showed that the cookie texture most preferred by panelists was the one with the highest percentage of arrowroot starch (80-90% of the total flour). Similarly, a similar study also showed that cookies made solely from arrowroot starch had the texture most preferred by panelists. Cookies made from arrowroot starch tend to have a structure that breaks easily and is crumbly because gluten is not formed during mixing due to the low protein content (Kifayah and Basori, 2015).

Determining the Best Treatment

The best treatment was determined through an effectiveness test using a weighting system. Weighting was carried out according to the role of each variable in the required cookie quality. The order of variable weights in this study was texture (1.0), taste (0.9), color (0.8), and aroma (0.7). Based on the results of the calculations, a final score was obtained for each treatment (formulation). The treatment with the highest final score was declared the best treatment. Table 6 shows that the treatment with the highest final score was F3, namely cookies made from 20% eggshell flour and 80% arrowroot starch. The average panelist assessment of F3 for each variable was 4.03 for texture, 4.13 for taste and color, and 4.05 for aroma.

Table 3. Assessment of the Best Treatment of Eggshell Cookie Texture

Code	Treatment	Final Value
F1	egg shell flour 10%, arrowroot starch 90%, kepok banana flour 0%	0.5170
F2	egg shell flour 15%, arrowroot starch 85%, kepok banana flour 0%	0.1244
F3	egg shell flour 20%, arrowroot starch 80%, kepok banana flour 0%	0.9910*
F4	10% egg shell flour, 45% arrowroot starch, 45% kepok banana flour	0.8959
F5	egg shell flour 15%, arrowroot starch 42.5%, kepok banana flour 42.5%	0.8641
F6	egg shell flour 20%, arrowroot starch 40%, kepok banana flour 40%	0.4692
F7	egg shell flour 10%, arrowroot starch 0%, kepok banana flour 90%	0.4324
F8	egg shell flour 15%, arrowroot starch 0%, kepok banana flour 85%	0.0000
F9	egg shell flour 20%, arrowroot starch 0%, kepok banana flour 80%	0.5768

Notes: * = best treatment

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The best formula (F3) has a water content of 2.59% and a total carbohydrate content of 61.22%. According to SNI 2973:2022, cookies are a type of biscuit made from soft, crispy dough, and when broken, the cross-section appears to be less dense in texture. The water content of cookies according to SNI 01-2973-1992 and SNI 2973:2022 is a maximum of 5%, while the minimum carbohydrate content is 70% according to SNI 01-2973-1992. In this study, the best formula (F3) has a carbohydrate content below the recommended standard. However, this is the same as the results of research by Anwar and Kristiastuti (2019), cookies made from arrowroot flour and kepok banana flour have a carbohydrate content of 64.62 grams/100 grams of cookies, where in USDA (2018) it is stated that in 100 grams of cookies with the main ingredient of wheat flour, the carbohydrate content is 76.67%. The minimum carbohydrate content recommended by SNI or other standards is for cookies in general, namely made from wheat flour, while if the ingredients for making cookies are substituted with flour other than wheat flour, there is a high possibility of a significant difference in carbohydrate content according to the characteristics of the flour used, which is generally lower than wheat flour. In this study, although the carbohydrate content in arrowroot flour (> 80%) is higher than the carbohydrate content in wheat flour (70-80%), the ingredients were modified by adding eggshell flour which has a carbohydrate content of only 1.09% (Kusumaningrum and Rahayu, 2018).

Conclusion

The product with the highest average color preference was F2 with 15% eggshell flour, 85% arrowroot starch. The product with the highest average aroma, taste, and texture preference was F3 with 20% eggshell flour, 80% arrowroot starch. The best treatment based on the effectiveness test results was F3. The average panelist assessment of F3 for each variable was 4.03 for texture, 4.13 for taste and color, and 4.05 for aroma. The eggshell flour-based cookies that were most preferred by the panelists from all hedonic aspects (texture, taste, color, and aroma) were those added with arrowroot starch in a dominant percentage (80%) without the addition of kepok banana flour.

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