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Pengaruh Aquafaba Kacang Tanah (Arachis Hypogaea L.) Terhadap Kualitas Sensoris Dan Fisik Kue Lidah Kucing

The Effect Of Peanuts Aquafaba (Arachis Hypogaea L) On The Sensory And Physical Quality Of Lidah Kucing Cookies

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Abstract

This study aimed to investigate the effect of using peanuts aquafaba on the sensory and physical quality of 'lidah kucing' cookies. A quantitative experimental design was employed, with three treatment groups varying the ratio of water to peanut aquafaba: 1:2, 1:3 and 1:4. Sensory quality was assessed by semi-trained panellists in terms of colour, scent, crispness, sweetness, peanuts flavour and aftertaste using the Kruskal-Wallis test followed by Tukey's test, whilst physical quality was analysed using ANOVA with a completely randomised design followed by Duncan's test. The results of the study showed that peanuts aquafaba had no effect on the colour, scent, crispness, and sweetness of 'lidah kucing'. However, there was an effect on the peanut flavour and peanut aftertaste, with the 1:2 treatment yielding the highest scores due to the higher concentration of aquafaba. In terms of physical quality, the 1:2 treatment produced the highest baking loss (39.2%) and was deemed the best as it indicated optimal water evaporation, whilst in terms of spreading power, the 1:4 treatment produced the highest spreading power (126.9%); consequently, the 1:2 treatment (68.1%) was assessed as the best treatment due to its low spreading power, resulting in a more stable and firm cake shape during the baking process. Peanuts aquafaba has the potential to serve as a plant-based alternative to egg white in 'lidah kucing' cookies, with optimal characteristics varying according to the concentration used.
Keywords: *peanuts aquafaba, lidah kucing cookies, sensory quality, physical quality*

Abstrak

Penelitian ini bertujuan untuk mengkaji pengaruh penggunaan *aquafaba* kacang tanah terhadap kualitas sensori dan fisik kue kering 'lidah kucing'. Desain eksperimental kuantitatif digunakan dengan tiga kelompok perlakuan yang memvariasikan rasio air terhadap *aquafaba* kacang tanah: 1:2, 1:3, dan 1:4. Kualitas sensori dinilai oleh panelis semi-terlatih berdasarkan aspek warna, aroma, kerenyahan, rasa manis, cita rasa kacang tanah, dan rasa sisa (*aftertaste*) menggunakan uji Kruskal-Wallis yang diikuti dengan uji Tukey, sedangkan kualitas fisik dianalisis menggunakan ANOVA dengan rancangan acak lengkap yang diikuti dengan uji Duncan. Hasil penelitian menunjukkan bahwa *aquafaba* kacang tanah tidak berpengaruh terhadap warna, aroma, kerenyahan, dan rasa manis kue 'lidah kucing'. Namun, terdapat pengaruh terhadap cita rasa kacang tanah dan rasa sisa kacang tanah, di mana perlakuan 1:2 menghasilkan skor tertinggi akibat konsentrasi *aquafaba* yang lebih tinggi. Dari segi kualitas fisik, perlakuan 1:2 menghasilkan penyusutan bobot saat pemanggangan (*baking loss*) tertinggi (39,2%) dan dinilai sebagai yang terbaik karena menunjukkan penguapan air yang optimal; sementara itu, terkait daya sebar, perlakuan 1:4 menghasilkan daya sebar tertinggi (126,9%), sehingga perlakuan 1:2 (68,1%) dinilai sebagai perlakuan terbaik karena daya sebarnya yang rendah menghasilkan bentuk kue yang lebih stabil dan kokoh selama proses pemanggangan. *Aquafaba* kacang tanah berpotensi menjadi alternatif nabati pengganti putih telur pada kue kering 'lidah kucing', dengan karakteristik optimal yang bervariasi tergantung pada konsentrasi yang digunakan.
Kata kunci: *aquafaba* kacang tanah, kue kering lidah kucing, kualitas sensori, kualitas fisik

1. Introduction

Lidah kucing cookies are one of the most popular dry cookies in Indonesia. These cookies have a distinctive elongated and thin shape resembling a cat's tongue. They are generally characterized by a yellowish-brown color, sweet taste, crisp texture, and a fragile structure that easily melts in the mouth (Sekar et al., 2023). One of the main

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characteristics that distinguishes *lidah kucing* cookies from other dry cookies is the use of egg white as a major component, especially because of its role in forming the texture of the product.

Egg white is commonly used due to its high protein content, particularly albumin, which has functional properties in foam formation and stabilization. During whipping, egg white proteins undergo denaturation, allowing them to bind air and form a light, porous dough structure (Bovšková & Míková, 2011). Eggs also contribute to cake structure by coagulating during heating. Compared with egg yolk or whole egg, egg white has better foaming ability because it contains proteins without fat, making it more effective in building structure and forming stable foam in baked products (Novianti et al., 2017).

Along with changing food consumption trends, consumer preferences have shifted toward healthier, environmentally friendly, and plant-based diets. Increasing awareness of vegan and vegetarian lifestyles has encouraged the development of food products that do not use animal-based ingredients. From an economic perspective, the rising price of eggs also affects production costs in the food industry.

One plant-based food innovation that has gained attention is aquafaba. The term aquafaba was first introduced by Goose Wohlt, a software engineer, in 2015. As a new vegan, Wohlt experimented with making meringue using the liquid from canned chickpeas by whipping it until it formed white foam, then adding sugar. The result closely resembled whipped egg white. The word aquafaba comes from Latin, namely *aqua*, meaning water, and *faba*, meaning bean (Stasiak et al., 2023). Mehren et al. (2025) define aquafaba as the liquid obtained from soaking or cooking legumes in water for a long period, which can be used as an egg white substitute because of its functional properties, including foaming, emulsion stabilization, and water-binding ability. During cooking, starch absorbs water, swells, and eventually ruptures, causing amylose and amylopectin to dissolve into the cooking water. This process produces the liquid known as aquafaba (Kubala, 2017).

Previous studies on aquafaba have mostly focused on chickpea cooking water. Several studies have shown that aquafaba can be used as an egg substitute in pastry products. Chickpea aquafaba has been applied in sponge cake and produced characteristics close to those of egg-based products (Mustafa et al., 2018). Other studies also reported that aquafaba could replace eggs in conventional cake with good sensory acceptance. In gluten-free cake formulations, powdered aquafaba performed the role of eggs effectively, particularly in increasing volume, maintaining structural stability, and improving final product texture (Silva et al., 2022). In meringue products, aquafaba showed high overrun capacity and foam stability (Choya et al., 2023). In Indonesia, chickpea aquafaba has been tested in macaron production and produced characteristics similar to macarons made with egg white (Ihsan et al., 2023). Aquafaba from red beans has also been studied in meringue production and was found to produce sufficiently stable foam, although differences in color and taste were observed (Novianti et al., 2017).

In practice, however, aquafaba used as an egg white substitute in Indonesia still relies mainly on chickpeas, which are imported. Peanut is one of the important legume commodities in Indonesia, both for direct consumption and as an industrial raw material. Its growth and productivity are influenced by cultivation factors such as soil conditions, fertilization, and variety selection. This indicates that peanut has strong potential to be developed as a local food ingredient with high economic value (Sudaryono, 2005).

Peanuts contain approximately 25–30% protein (Rahayu et al., 2020), which may produce cooking liquid with functional properties similar to aquafaba made from chickpeas or garbanzo beans. The use of peanut cooking water as local aquafaba offers several advantages. First, it can reduce kitchen waste because peanut cooking water, which is usually discarded, can be processed into a functional food ingredient. Second, it supports the use of local plant-based ingredients, contributing to national food security and sustainable food development. Third, peanut aquafaba as an egg white substitute can reduce dependence on animal-based ingredients while providing an alternative for individuals with egg allergy or those following a plant-based diet.

The characteristics of aquafaba are strongly influenced by its processing method, especially the amount of water used during boiling. Variation in boiling water affects the dissolution of chemical components from the peanut tissue into the cooking liquid, including soluble proteins and carbohydrates. These components influence the concentration of dissolved solids and the functional properties of aquafaba. Different physical and chemical characteristics of aquafaba may result in different abilities to form and stabilize foam. These differences may affect the baking process and the sensory quality of the final product. Therefore, the amount of water used in boiling peanuts is an important factor in the use of peanut aquafaba as an egg white substitute in *lidah kucing* cookies.

Further study is needed to evaluate the functional ability of peanut aquafaba in replacing egg white, particularly in a specific product such as *lidah kucing* cookies. It is necessary to examine how peanut cooking water, or peanut aquafaba, affects the sensory quality of *lidah kucing* cookies, including color, aroma, taste, and texture. This study is expected to provide information on the effectiveness of peanut aquafaba as an egg white substitute in terms of product appearance and final quality. The findings may serve as a basis for developing local food-based innovations that are economical and suitable for consumers following plant-based diets. Therefore, this study was conducted under the title "The Effect of Peanut Aquafaba (*Arachis hypogaea* L.) on the Sensory Quality and Physical Characteristics of *Lidah Kucing* Cookies."

2. Method

This study used a quantitative experimental design to evaluate the effect of peanut aquafaba as a full egg-white substitute on the sensory quality and physical characteristics of *lidah kucing* cookies. The study was conducted at the Bread and Cake Laboratory, Culinary Education Study Program, Faculty of Engineering, Universitas Negeri Jakarta, from August 2025 to June 2026. The research subjects were semi-trained panelists from the Culinary Education Study Program who had taken or completed an organoleptic evaluation course.

The treatment factor was the ratio of peanut to water used in aquafaba preparation, consisting of three levels: 1:2, 1:3, and 1:4. Each treatment used 100 g of peanuts boiled with 200 mL, 300 mL, and 400 mL of water, respectively. The resulting peanut aquafaba was used to replace egg white completely in the cookie formulation. The basic formula consisted of 160 g wheat flour, 175 g margarine, 100 g powdered sugar, 120 g peanut aquafaba, and 5 g vanilla.

Peanut aquafaba was prepared by soaking peanuts in clean water at a 1:4 ratio for 16 hours at room temperature. After soaking, the peanuts were washed and weighed. Each treatment was prepared using 100 g of peanuts with the assigned volume of water. The mixture was pre-heated in a microwave for 5 minutes to soften the peanut tissue, then cooked in a pressure cooker at 70 kPa for 20 minutes. The cooked mixture was cooled and stored in a refrigerator for 24 hours, then filtered using a fine strainer to separate the peanut residue from the liquid. The filtered liquid was used as peanut aquafaba in the cookie formulation.

The *lidah kucing* cookies were prepared using the creaming method. Margarine, powdered sugar, and vanilla were mixed using a hand mixer at speed 1 for 1 minute and speed 2 for 3 minutes until the mixture became soft, pale, and homogeneous. Peanut aquafaba was then added gradually and mixed again at speed 1 for 1 minute and speed 2 for 3 minutes until the batter became lighter and more uniform. Wheat flour was added gradually and mixed at speed 1 for 1 minute. The batter was transferred into a piping bag fitted with a 1 cm nozzle and shaped into 5 g portions. The cookies were baked in an oven at 140°C for 25 minutes, cooled at room temperature for 5 minutes, and stored in clean, dry, airtight containers.

Sensory quality was evaluated using a hedonic quality test involving 45 semi-trained panelists. The samples were served randomly using three-digit codes: 742 for the 1:2 treatment, 913 for the 1:3 treatment, and 526 for the 1:4 treatment. The assessed sensory attributes included color, peanut aroma, crisp texture, sweetness, peanut taste, and peanut aftertaste. Each attribute was evaluated using a five-point scale according to the sensory descriptor for each parameter.

Physical quality was measured based on baking loss and spreading capacity. Baking loss was calculated by weighing the dough before baking and the cookies after baking and cooling. The percentage of baking loss was calculated using the formula: Baking loss (%) = $[(A - B) / A] \times 100$,

where A is the dough weight before baking and B is the cookie weight after baking and cooling. Spreading capacity was measured by recording the width of the cookie dough before baking and the cookie width after baking and cooling using a caliper. The percentage of spreading capacity was calculated using the formula: Spreading capacity (%) = $[(B - A) / A] \times 100$, where A is the initial dough width and B is the cookie width after baking and cooling.

Sensory data were analyzed using the Kruskal–Wallis test because the hedonic quality data were ordinal. When significant differences were found, the analysis was continued using Tukey's test to identify differences between treatments. Physical quality data, including baking loss and spreading capacity, were analyzed using analysis of variance based on a completely randomized design. Duncan's multiple range test at a 95% confidence level was applied when significant treatment effects were detected.

3. Results And Discussion

Results

The sensory quality test was conducted with 45 semi-trained panelists, with 15 panelists assessing each treatment sample. The assessed attributes were color, peanut aroma, brittle texture, sweetness, peanut taste, and peanut aftertaste. The three treatments were peanut aquafaba prepared using peanut-to-water ratios of 1:2, 1:3, and 1:4.

Table 1. Mean sensory scores and Kruskal–Wallis test results

Sensory attribute	1:2	1:3	1:4	χ^2 calculated	χ^2 table	Interpretation
Color	4.87	4.73	4.27	4.431	5.991	Not significant
Peanut aroma	2.67	2.67	2.60	0.060	5.991	Not significant
Brittle texture	4.60	4.67	4.67	0.114	5.991	Not significant
Sweetness	4.27	4.27	4.33	0.031	5.991	Not significant
Peanut taste	4.13	3.00	2.93	8.278	5.991	Significant
Peanut aftertaste	4.00	3.33	3.00	6.148	5.991	Significant

Based on the Kruskal–Wallis test, peanut aquafaba did not significantly affect color, peanut aroma, brittle texture, or sweetness because the calculated χ^2 values were lower than the χ^2 table value. However, peanut aquafaba significantly affected peanut taste and peanut aftertaste. The 1:2 treatment produced the highest mean scores for peanut taste and aftertaste, indicating that a lower water ratio produced a more concentrated aquafaba and a stronger peanut sensory profile.

Table 2. Tukey post-hoc test for significant sensory attributes

Attribute	Comparison	Mean difference	Critical value	Interpretation
Peanut taste	1:2 vs 1:3	1.13	0.33	Significant
Peanut taste	1:2 vs 1:4	1.20	0.33	Significant
Peanut taste	1:3 vs 1:4	0.07	0.33	Not significant
Peanut aftertaste	1:2 vs 1:3	0.67	0.29	Significant
Peanut aftertaste	1:2 vs 1:4	1.00	0.29	Significant
Peanut aftertaste	1:3 vs 1:4	0.33	0.29	Significant

The Tukey test showed that the 1:2 treatment differed significantly from both 1:3 and 1:4 in peanut taste. Meanwhile, 1:3 and 1:4 did not differ significantly. For peanut aftertaste, all treatment comparisons showed significant differences. These results indicate that the 1:2 ratio was the most optimal treatment for producing a distinct peanut taste and aftertaste in *lidah kucing* cookies.

Physical Quality

Physical quality was evaluated based on baking loss and spreading capacity. Both parameters were measured in three replications for each treatment. Normality and homogeneity tests showed that the physical quality data were normally distributed and homogeneous, allowing further analysis using ANOVA.

Table 3. Mean physical quality of *lidah kucing* cookies with peanut aquafaba

Physical parameter	1:2	1:3	1:4	Highest value
Baking loss (%)	39.2	31.8	13.5	1:2
Spreading capacity (%)	68.1	90.7	126.9	1:4

The 1:2 treatment produced the highest baking loss, with a mean value of 39.2%, followed by 1:3 at 31.8% and 1:4 at 13.5%. A higher baking loss indicates greater moisture evaporation during baking. In contrast, spreading capacity increased as the water ratio increased. The 1:4 treatment showed the highest spreading capacity at 126.9%, followed by 1:3 at 90.7% and 1:2 at 68.1%.

Table 4. ANOVA results for physical quality

Physical parameter	F calculated	F table	Interpretation
Baking loss	141.22	5.14	Significant
Spreading capacity	831.59	5.14	Significant

The ANOVA results showed that peanut aquafaba ratio had a significant effect on both baking loss and spreading capacity, as the calculated F values were higher than the F table value. Therefore, Duncan's multiple range test was conducted to determine differences among treatments.

Table 5. Duncan's multiple range test for physical quality

Parameter	Treatment	Mean	Notation
Baking loss (%)	1:2	39.2	a
Baking loss (%)	1:3	31.8	b
Baking loss (%)	1:4	13.5	c
Spreading capacity (%)	1:4	126.9	a
Spreading capacity (%)	1:3	90.7	b
Spreading capacity (%)	1:2	68.1	c

Duncan's test confirmed that each treatment differed significantly in baking loss and spreading capacity. The 1:2 treatment was the best for baking loss because it produced the highest value, indicating greater water evaporation during baking. For spreading capacity, the 1:4 treatment produced the highest spread; however, excessive spreading is not desirable for *lidah kucing* cookies because the product is expected to have a stable and firm shape. Therefore, the 1:2 treatment was considered the best in terms of shape stability because it had the lowest spreading capacity.

DISCUSSION

The hypothesis test results for sensory quality in the color aspect showed that there was no effect of peanut aquafaba lidah kucing with peanut and water ratios of 1:2, 1:3, and 1:4 on the sensory quality of the color aspect (x^2 calculated = 4.431 < x^2 table = 5.991). The highest mean value was obtained by the 1:2 treatment with a score of 4.87, which was included in the golden yellow category. The absence of a significant difference among treatments in the color aspect was caused by the fact that the color of cookies is more dominantly influenced by ingredients whose amounts were constant in all treatments, namely wheat flour, butter, and sugar. The golden yellow color produced by cookies is the result of the Maillard reaction, namely the reaction between reducing sugars and amino acids that occurs during the baking process at high temperatures, as well as the sugar caramelization process (Hustiany, 2016). The difference in aquafaba concentration among treatments was not significant enough to change the color profile of the product because the protein content of peanut aquafaba that contributes to the Maillard reaction was relatively small compared with other ingredients in the formula.

The hypothesis test results for sensory quality in the aroma aspect showed that there was no effect of peanut aquafaba lidah kucing with peanut and water ratios of 1:2, 1:3, and 1:4 on the sensory quality of the peanut aroma aspect (x^2 calculated = 0.060 < x^2 table = 5.991). The highest mean values were obtained by the 1:2 and 1:3 treatments with a score of 2.67, which was included in the moderately peanut-aromatic category. The absence of an effect on the peanut aroma aspect may be caused by the fact that the characteristic peanut aroma is determined by volatile compounds, especially pyrazines, which are formed through the roasting process at high temperatures (Smith & Barringer, 2014). Meanwhile, the aquafaba-making process used in this study was produced from boiling peanuts at a temperature far lower than the roasting temperature, so the formation of pyrazine volatile compounds did not occur optimally, resulting in a weak peanut aroma and no significant difference among treatments. In addition, the baking process of lidah kucing at high temperature produced a dominant margarine aroma, which could mask the peanut aroma originating from aquafaba.

The hypothesis test results for sensory quality in the brittle texture aspect showed that there was no effect of peanut aquafaba use on the sensory quality of the brittle texture aspect of lidah kucing (x^2 calculated = 0.114 < x^2 table = 5.991). The highest mean values were obtained by the 1:3 and 1:4 treatments with a score of 4.67, which was included in the brittle category. Crispness or brittle texture in cookies is more dominantly influenced by the fat and sugar ratio in the formula, which in this study was constant for all treatments (Jacob & Leelavathi, 2007). Aquafaba as an egg white substitute contains functional protein, which is able to form foam and bind ingredients; however, technically, the effect given was not significantly different on brittle texture among treatments.

The hypothesis test results for sensory quality in the sweetness aspect showed that there was no effect of peanut aquafaba use on the sensory quality of the sweetness aspect of lidah kucing (x^2 calculated = 0.031 < x^2 table = 5.991). The highest mean value was obtained by the 1:4 treatment with a score of 4.33, which was included in the slightly sweet category. The sweet taste in lidah kucing comes from the sugar added to the dough formula. The function of sugar in cookie making, besides acting as a sweetener, is also to improve texture and provide color to the surface of cookies (Ervina et al., 2024). Peanut aquafaba does not contain a significant sugar level to noticeably change the sweet taste profile of the product, so variation in the volume of boiling water did not give an effect detected by panelists in this aspect.

The hypothesis test results for sensory quality in the peanut taste aspect showed that there was an effect of peanut aquafaba use on the sensory quality of the peanut taste aspect of lidah kucing (x^2 calculated = 8.278 > x^2 table = 5.991). The highest mean value was obtained by the 1:2 treatment with a score of 4.13, which was included in the slightly peanut-taste category. Based on the Tuckey follow-up test, the 1:2 treatment was significantly different from the 1:3 and 1:4 treatments, while the 1:3 and 1:4 treatments were not significantly different from each other. The 1:2 treatment used the least amount of water, resulting in the most concentrated aquafaba with a higher concentration of peanut flavor compounds. Water-soluble peanut taste-forming compounds, such as free amino acids and phenolic compounds, were extracted in greater amounts per unit volume in concentrated aquafaba compared with diluted aquafaba (Fu et al., 2024). The more diluted the aquafaba was, as in the 1:4 treatment, the lower the concentration of these compounds per unit volume used in the formula, so the peanut taste detected by panelists became weaker. Therefore, the 1:2 treatment was declared the best treatment because it produced the most optimal peanut taste characteristics.

The hypothesis test results for sensory quality in the peanut aftertaste aspect showed that there was an effect of peanut aquafaba use on the sensory quality of the peanut aftertaste aspect of lidah kucing (x^2 calculated = 6.148 > x^2 table = 5.991). The highest mean value was obtained by the 1:2 treatment with a score of 4.0, which was included in the slightly strong category. The Tuckey follow-up test showed that the three treatments were significantly different from one another. Aftertaste is the taste sensation that remains after food is swallowed and is part of the overall taste perception of a food product (Iqbal et al., 2024). The 1:2 treatment with the most concentrated aquafaba produced the strongest peanut aftertaste, in line with the results in the peanut taste aspect. This is related to the saponin content in peanuts that is also extracted into the boiling water. Saponins are compounds known to provide a lingering sensation or a taste that lasts longer in the oral cavity after food is swallowed (Sahin et al., 2024). The more concentrated the aquafaba, the higher the concentration of saponins carried into the formula, so the peanut aftertaste perceived by panelists became stronger and lasted longer. Therefore, the 1:2 treatment was declared the best treatment because it produced the most optimal peanut aftertaste characteristics.

The hypothesis test results for physical quality in the baking loss aspect showed that there was an effect of peanut aquafaba use on the physical quality of baking loss in lidah kucing in the 1:2, 1:3, and 1:4 treatments. The highest mean baking loss value was found in the 1:2 treatment, namely 39.2%, followed by the 1:3 treatment at 31.8% and the 1:4 treatment at 13.5%. Based on these results, it can be concluded that the less water volume used in boiling peanuts, the more concentrated the aquafaba produced and the higher the baking loss value of lidah kucing. Baking loss is related to the loss of water content during the baking process (Fellows, 2009). The high baking loss value in the 1:2 treatment was suspected to be related to the high concentration of dissolved solids in aquafaba, such as soluble protein and soluble starch, compared with the 1:3 and 1:4 treatments. A higher concentration of dissolved solids affects the characteristics of the dough and the amount of water bound in it. During the baking process, the water contained in the dough evaporates, causing a decrease in product weight. Therefore, the 1:2 treatment produced a higher baking loss value than the other treatments. This result is in line with the study by F. Alsalman et al. (2020), which stated that the concentration of dissolved solids in aquafaba can affect the physical characteristics of the resulting food product.

The high baking loss value in the 1:2 treatment showed that during the baking process, greater evaporation of water and volatile components occurred compared with the other treatments. This indicates that the dough structure in this treatment allowed a more optimal release of water vapor during the baking process. Conversely, the 1:4 treatment with the lowest baking loss value showed that mass loss during baking was smaller, indicating more limited water evaporation. Based on the expected characteristics of peanut aquafaba lidah kucing cookies, which should have a dry, light, and fully baked texture, the higher baking loss in the 1:2 treatment can indicate a more optimal baking process in removing water content, thus producing product characteristics that meet cookie criteria. Therefore, the 1:2 treatment can be declared a better treatment in the baking loss aspect compared with the other treatments.

The hypothesis test results for physical quality in the spreading capacity aspect showed that there was an effect of peanut aquafaba use on the spreading capacity of lidah kucing. The highest mean spreading capacity value was found in the 1:4 treatment, namely 126.9%, followed by the 1:3 treatment at 90.7% and the 1:2 treatment at 68.1%. Based on these results, it can be concluded that the more water volume used in boiling, the more diluted the aquafaba produced and the higher the spreading capacity of lidah kucing. The high spreading capacity in the 1:4 treatment was related to the higher water content in diluted aquafaba, so the dough produced had a softer consistency and spread more easily during baking. Conversely, concentrated aquafaba in the 1:2 treatment contained more protein that formed a stronger structural network in the dough, thereby inhibiting dough spreading during baking and producing lower spreading capacity. This is in line with the baking loss value in the 1:2 treatment, which was the highest, showing that dough with concentrated aquafaba maintained its shape better but lost more water during baking (F. Alsalman et al., 2020).

The high spreading capacity value in the 1:4 treatment showed that the dough had a greater tendency to spread during the baking process, resulting in a wider and thinner product. Conversely, the 1:2 treatment with the lowest spreading capacity value showed that the product was better able to maintain its shape during baking, resulting in a stronger structure and not spreading excessively. Based on the expected characteristics of peanut aquafaba lidah kucing cookies, which should have a firm structure and not spread excessively, the 1:2 treatment can be declared the best treatment in the spreading capacity aspect because it had the lowest spreading capacity value and showed better shape stability compared with the other treatments.

4. Conclusion

Based on the results, peanut aquafaba significantly affected peanut taste, peanut aftertaste, baking loss, and spreading capacity of *lidah kucing* cookies, but did not significantly affect color, peanut aroma, brittle texture, and sweetness. The 1:2 peanut-to-water ratio produced the highest mean scores for peanut taste (4.13) and peanut aftertaste (4.00), indicating a stronger peanut sensory profile due to the more concentrated aquafaba. This treatment also showed the highest baking loss (39.2%) and the lowest spreading capacity (68.1%), suggesting more optimal moisture evaporation and better shape stability during baking. Therefore, the 1:2 ratio is recommended as the best formulation for developing peanut aquafaba-based *lidah kucing* cookies, although further studies are needed to evaluate shelf life, chemical characteristics of peanut aquafaba, and formulation improvements for sensory attributes that did not show significant differences.

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