



Consumer Acceptance of Rice and Sand Ginger Mochi Filled with Tamarind Turmeric Ice Cream

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ABSTRACTS

Mochi is a traditional confectionery widely favoured, especially in Japan, where it is classified as Wagashi a type of sweet dish consumed since ancient times and traditionally prepared during the New Year celebration known as Mochitsuki. Over time, mochi has evolved through the incorporation of various ingredients to enhance its functional and nutritional value. One innovative approach involves replacing the liquid component with traditional herbal beverages. This study focuses on the development of Rice and Aromatic Ginger Mochi, a modern variation that incorporates a blend of rice and aromatic ginger a traditional Indonesian herbal drink as the liquid base in the mochi dough. The product is filled with sour turmeric ice cream, resulting in a unique flavour profile that merges traditional heritage with contemporary dessert innovation. The primary aim of this research is to evaluate the acceptability of this mochi variation. A true experimental design within the quantitative research paradigm was used. Sensory evaluations assessed six key attributes: appearance, colour, taste, texture, aroma, and overall impression. Results showed high acceptability levels, with all attributes except aroma receiving scores above 85%. Aroma scored slightly lower at 83% but still indicated a favourable response from participants. In conclusion, rice and aromatic ginger mochi filled with sour turmeric ice cream is a promising and innovative culinary product. It effectively combines the health benefits and cultural significance of traditional ingredients with modern taste preferences, making it suitable for contemporary markets.

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1. INTRODUCTION

Mochi is a traditional cake that originates from East Asia and is widely enjoyed by various groups. It is particularly popular in countries such as China and Japan. In Japan, mochi is categorized as Wagashi, a type of traditional sweet that has been consumed for centuries and is typically prepared using time-honoured methods. Mochi is also a ceremonial food served during the Mochitsuki celebration, which marks the Japanese New Year, and is often presented as a side dish during tea time (New World Encyclopedia, 2020). Over time, mochi has undergone several modifications through the incorporation of new ingredients or substitutions to enhance its functional and nutritional value (Lungga et al., 2016). One such modification includes replacing the liquid component in mochi preparation—traditionally water with other liquids such as milk, coconut milk, or herbal infusions to improve both texture and health benefits (Sari & Prameswari, 2022).

Indonesia is rich in traditional herbal beverages, commonly known as jamu, which are widely consumed for their medicinal and wellness properties. According to the Jember Portal (2020), jamu kunyit asam (tamarind turmeric drink) and beras kencur (rice and aromatic ginger drink) are among the most popular. These herbal beverages offer opportunities for product innovation, particularly in developing mochi with enhanced health benefits. This innovation is represented in the creation of Rice and Aromatic Ginger Mochi. Mochi is made from glutinous rice flour and comes in various forms, such as daifuku (filled with red beans), ichigo daifuku (red bean paste and whole strawberries), kusa mochi (green herbal mochi), and ice cream mochi. Ice cream itself is a frozen dessert made through a combination of freezing and agitation processes, using ingredients such as milk, sweeteners, stabilizers, emulsifiers, and flavour enhancers (Harris, 2011).

In this study, researchers aim to create an innovative mochi ice cream product that integrates Indonesian traditional herbal drinks by using rice and aromatic ginger-based mochi filled with tamarind turmeric ice cream. Based on this innovation, it is important to evaluate the acceptability of the product in terms of appearance, aroma, taste, colour, texture, and overall impression.

2. METHODS

This study employs an experimental method, categorized under quantitative research. The research design used is a true experimental design, allowing for controlled testing of product variations. The researcher also applied the Quantitative Descriptive Analysis (QDA) method to determine the most appropriate formulation of rice and aromatic ginger mochi filled with sour turmeric ice cream, as well as a hedonic (liking) test to assess product acceptability.

Participants in this study consisted of two groups:

- Three expert panellists for the QDA test, and
- Thirty untrained panellists from the general public, specifically those familiar with and fond of traditional herbal drinks such as *beras kencur* and *kunyit asam*.

The instruments used included:

- Descriptive test sheets for QDA, and
- Acceptability questionnaires using a 5-point hedonic scale, where:
 - Score 1 = Strongly dislike
 - Score 2 = Dislike
 - Score 3 = Neutral/Somewhat like

- Score 4 = Like
- Score 5 = Strongly like

The research was conducted between June 2022 and August 2022, with all experimental procedures and acceptability testing performed at the researcher's residence.

Ingredients used in the product formulation included Japanese glutinous rice flour, vanilla powder, salt, *beras kencur* herbal extract, liquid milk, cream, *kunyit asam* extract, egg yolks, granulated sugar, cornstarch, and powdered milk.

Tools utilized for preparation included digital scales, mixing bowls, measuring cups, saucepans, a stove, rubber spatulas, strainers, spoons, a freezer, a blender, and serving plates.

The research procedure was carried out in the following stages:

1. Analyzing existing recipes for mochi, *beras kencur*, and sour turmeric ice cream.
2. Conducting preliminary recipe trials.
3. Performing QDA on the preliminary trials.
4. Developing and refining the formulation for rice and aromatic ginger mochi filled with sour turmeric ice cream.
5. Conducting QDA tests on the developed product.
6. Evaluating product acceptability through consumer sensory testing.

3. RESULT AND DISCUSSION

3.1. Product Innovation Results

3.1.1. Reference Recipe for Mochi

The reference recipe used in this experiment was developed through a recipe analysis process. The researcher collected ten recipes from various reputable sources, which were then analyzed to formulate a standardized reference recipe. This composite recipe consists of three components: the mochi dough recipe, the aromatic ginger rice (*beras kencur*) herbal drink recipe, and the sour turmeric ice cream recipe.

3.1.2. Trial Production of Kencur Rice Mochi Filled with Sour Turmeric Ice Cream

Trials for producing kencur rice mochi filled with sour turmeric ice cream were conducted twice to determine the optimal formulation. The best formulation obtained from these trials is as follows:

Kencur Rice Mochi Formula:

- 300 g Japanese glutinous rice flour
- 350 ml *jamu beras kencur* (rice and aromatic ginger herbal drink)
- 2 g vanilla powder
- 2 g salt

3.1.3. Product Characteristics

The final rice and sand ginger mochi product filled with sour turmeric ice cream exhibited the following characteristics:

- A pale off-white colour, derived from the natural colouring of the rice and aromatic ginger herbal drink
- A sweet and mildly warm taste, due to the presence of aromatic ginger in the herbal infusion
- A distinct aromatic ginger aroma, considered fairly strong but pleasant
- A chewy and elastic texture, consistent with typical mochi products

3.1.4. Quantitative Descriptive Analysis (QDA) Results

The QDA test was conducted by three expert panellists, who evaluated the sensory attributes of the product. The data collected from this assessment are presented in Figure 1.

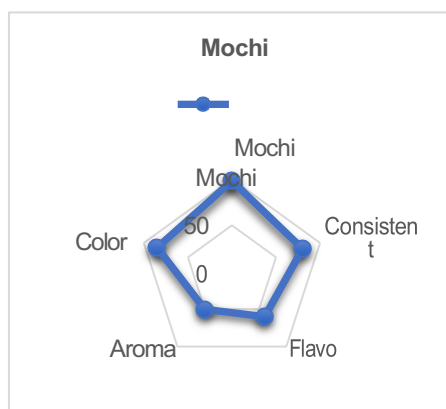


Figure 1. The QDA test mochi was carried out on 3 expert panelists

The mochi texture criteria has a value of 100, which means the mochi has a smooth surface texture. In terms of elastic consistency, the starting mochi recipe has a value of 80. The sweetness criterion for this mochi has a value of 60, the vanilla aroma that can be smelled in the mochi product has a value of 50 and the colour criterion has a value of 85. The QDA test jamu rice aromatic ginger was carried out on 3 expert panelists can see the Figure 2.

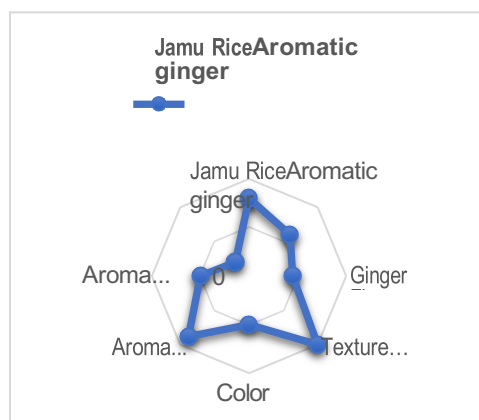


Figure 2. The QDA test jamu rice aromatic ginger was carried out on 3 expert panelists

The criteria for the taste of kencur is 80, the taste of rice is 60, the taste of ginger has a value of 45. In the criteria for smoothness of texture, rice has a value 100. The color criteria for this kencur rice herbal medicine has a value of 50, and in terms of aroma starting from the aroma of kencur has a value of 88, the aroma of ginger has a value of 50. For the viscosity of the kencur rice herbal medicine or what can also be called the consistency of the herbal medicine, it has a value of 20 which means that the kencur rice herbal medicine has a liquid consistency. The QDA ice cream turmeric sour was carried out on 3 expert panelists can see the Figure 3.

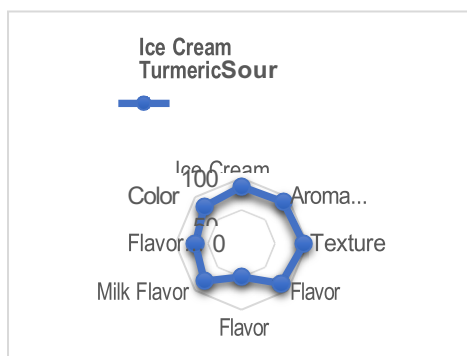


Figure 3. The QDA ice cream turmeric sour was carried out on 3 expert panelists

Data obtained from the QDA test on the starting sour turmeric ice cream recipe has a value for the aroma ranging from the milk aroma in the weak to strong range, namely 87, and the turmeric aroma has a value of 90. This ice cream has a soft texture as seen from the value obtained, namely 95. The taste created by the sour turmeric herbal medicine makes the turmeric taste quite strong, as seen from the score obtained at 85 and the sour taste at 50. The milk taste in this product has a score of 80, which means the milk in the ice cream is very strong. The sweet taste has a value of 70 and the color criteria in the pale to light range has a value of 80. The QDA test from 3 expert panelists was carried out 2 times so that a product could be created that met the criteria can see the Figure 4.

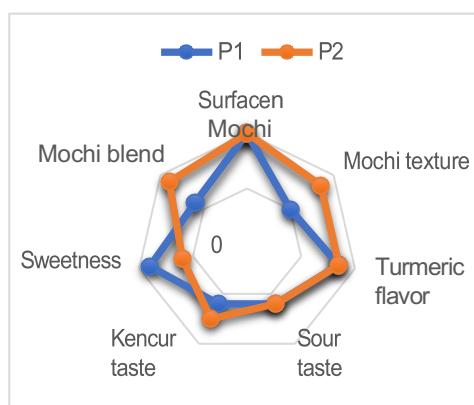


Figure 4. The QDA test from 3 expert panelists was carried out 2 times

The QDA test from 3 expert panelists was carried out 2 times so that a product could be created that met the criteria. Both product trials had a value on the mochi surface criteria of 100 which means that kencur rice mochi has a smooth surface. Mochi texture criteria in the range of not chewy to chewy in P1 have a value of 50 while P2 has a value of 85. Criteria for taste in the range of weak to very strong starting from turmeric taste has a value of 85, sour taste has a value of 60, kencur taste in P1 has a value of 60 and P2 has a value of 75, and the sweet taste of product P1 has a value of 90 while product P2 has a value 60. The experimental product kencur rice mochi filled with sour turmeric ice cream in P1 has a combination with a value of 60 while P2 has a value of 90.

The visible difference between products P1 and P2 lies in the chewy texture of the mochi, this is caused by rice which has starch which forms a soft and non-sticky texture when cooked. Rice starch also makes the product not clear after going through the cooking process.

4. ACCEPTANCE TEST

The acceptability test was carried out using a hedonic scale instrument to determine the panelists' level of preference for the kencur rice mochi product filled with sour turmeric ice cream.

The acceptability test was carried out on Wednesday, August 17, 2022, at home and was carried out on 30 untrained panelists. The data was processed using Microsoft Excel and the following results were obtained:

4.1. Appearance

Table 1 show that the appearance of filled kencur rice mochi *ice cream* sour turmeric

Table 1. Appearance of Filled Kencur Rice Mochi *ice cream* Sour Turmeric

	Scale	Amount	Score	%
Apperance	1	0	0	0%
	2	0	0	0%
	3	1	3	2%
	4	16	64	43%
	5	13	65	43%
Total			132	88%

The results of the appearance evaluation show that the visual appeal of the *kencur rice mochi filled with sour turmeric ice cream* was rated highly by the panellists. Both scale 4 ("like") and scale 5 ("strongly like") received an equal response rate of 43%, indicating a strong positive impression. Only 2% of the participants rated the product as neutral (scale 3), and no respondents gave negative ratings (scales 1 or 2).

These findings indicate that the product successfully achieved an aesthetically pleasing appearance, which is a critical factor influencing consumer expectations and initial acceptance. The light yellowish-white tone, derived from the turmeric and *beras kencur* herbal infusion, likely contributed to a perception of freshness and naturalness. Color and surface appearance are closely linked to perceived quality and flavour anticipation (Deliza & MacFie, 2021).

According to previous studies, the appearance of functional food products should not only be visually attractive but also signal healthfulness and authenticity, especially when traditional herbal components are involved (Spence et al., 2022). The glossy texture of the mochi surface and the consistent shape also likely enhanced the visual impression. Moreover, in the development of novel food products, appearance is the first sensory cue that influences consumers before taste or aroma is experienced. In this case, the high rating affirms that the product effectively balances traditional identity with modern dessert aesthetics.

4.2. Aroma

Table 2 show that the kencur rice mochi filled with sour turmeric ice cream received a generally positive response from the panelists

Table 2. Aroma of Kencur Rice Mochi Filled with Turmeric Sour ice cream

	Scale	Amount	Score	%
Aroma	1	0	0	0%
	2	0	0	0%
	3	16	18	12%
	4	14	56	37%
	5	10	50	33%
Total			132	83%

The results of the aroma evaluation in Table 1 show that the kencur rice mochi filled with sour turmeric ice cream received a generally positive response from the panelists. The highest proportion of responses was at scale 4 (“like”) with 37%, followed by 33% at scale 5 (“strongly like”), and 12% at scale 3 (“neutral”). No panelists selected scale 1 or 2, indicating zero negative feedback on aroma.

These results suggest that while the aroma was acceptable, it was less dominant in preference compared to other sensory attributes such as taste and texture. The combination of aromatic ginger (kencur) and turmeric produces a strong and distinctive herbal scent, which can be polarizing depending on cultural familiarity and individual preferences (Chung et al., 2022). Although these herbs are valued in traditional Indonesian beverages, their scent especially turmeric’s earthy notes may be perceived as overpowering by some consumers, particularly in sweet dessert contexts (Liu et al., 2021). Nevertheless, the overall acceptability of aroma at 83% is still considered high and supports the product’s viability. The aroma profile contributes to the perception of healthfulness and authenticity in products that incorporate natural and functional ingredients (Spence, 2020). Enhancing aroma harmony with sweet or vanilla notes may further increase consumer acceptance in future formulations.

4.3. Flavor

The data in Table 3 show that the flavour attribute of the kencur rice mochi filled with sour turmeric ice cream received a high level of acceptance.

Table 3. Flavor of Filled Kencur Rice Mochi *ice cream* Sour Turmeric

	Scale	Amount	Score	%
Flavor	1	0	0	0%
	2	0	0	0%
	3	4	12	8%
	4	13	52	35%
	5	13	65	43%
Total			132	86%

The highest proportion of responses (43%) rated the product at scale 5 (strongly like), followed by 35% at scale 4 (like), and 8% at scale 3 (neutral). No panelists rated the flavour as “dislike” or “strongly dislike,” indicating a complete absence of negative responses.

These results highlight the successful fusion of traditional Indonesian herbal flavors with a contemporary dessert concept. The flavour combination of beras kencur and kunyit asam provides a sweet, slightly spicy, and tangy profile that was both novel and palatable to the panellists. Turmeric and aromatic ginger contain bioactive compounds like curcumin and essential oils, which contribute not only to functional health benefits but also to a distinctive flavour complexity (Chandra et al., 2021).

Flavour is one of the most decisive factors influencing consumer food preferences and purchasing behaviour. When a product combines familiar tastes with innovative formats, such as ice cream-filled mochi, it can enhance consumer curiosity and enjoyment (Wang & Spence, 2022). Additionally, the use of natural flavourings from traditional herbal drinks may improve the perceived healthfulness of the product, which is increasingly valued by today's consumers (Martínez & Delgado, 2020). Thus, the high acceptability score for flavour demonstrates that this innovative product successfully delivers both sensorial satisfaction and cultural resonance, making it a promising candidate for further development and commercialization.

4.4. Colour

The data in Table 4 indicate that the colour attribute of the kencur rice mochi filled with sour turmeric ice cream was well-received by panellists.

Table 4. Colour of Kencur Rice Mochi Filled with Turmeric Sour ice cream

	Scale	Amount	Score	%
Color	1	0	0	0%
	2	0	0	0%
	3	1	3	2%
	4	13	52	35%
	5	16	80	53%
Total			135	90%

A majority of 53% rated the colour on scale 5 (strongly like), and 35% gave it a rating of 4 (like). Only 2% of the panellists rated the colour as neutral (scale 3), while no negative responses (scales 1 and 2) were recorded. These findings suggest that the natural coloration derived from the kencur and turmeric herbal extracts resulted in an aesthetically pleasing appearance. The slight yellowish-white hue of the mochi, influenced by the turmeric component, is commonly associated with freshness and naturalness, which can positively affect consumer perception (Almeida et al., 2021).

Colour is a critical determinant in the first impression of food products, often influencing taste expectations and purchase decisions (Hutchings, 2022). Yellow to golden tones in desserts are frequently associated with richness and health-enhancing ingredients such as turmeric (Li et al., 2020). The high rating on the colour attribute supports the idea that consumers are increasingly responsive to natural, functional food products with visually appealing characteristics. Furthermore, since colour plays an essential role in shaping the overall acceptability of a product, these results emphasize the importance of ingredient selection not only for flavour but also for visual appeal, particularly in fusion products combining tradition with innovation.

4.5. Texture

The data in Table 5 indicate that the show that the texture attribute of the kencur rice mochi filled with sour turmeric ice cream.

Table 5. Texture of Kencur Rice Mochi Filled with Turmeric Sour ice cream

	Scale	Amount	Score	%
Texture	1	0	0	0%
	2	0	0	0%
	3	0	0	0%
	4	7	28	19%
	5	23	115	77%
Total			143	95%

The results show that the texture attribute of the kencur rice mochi filled with sour turmeric ice cream was highly rated by the panelists. A significant majority, 77%, rated it at the highest level on the hedonic scale (5 – “strongly like”), while an additional 19% rated it as “like” (scale 4). No participants selected scales 1, 2, or 3, indicating that there were no negative or neutral responses regarding the texture. This overwhelmingly positive evaluation suggests that the product successfully achieved the ideal mochi texture, which is typically characterized by a chewy, elastic, and cohesive structure. These characteristics are crucial to consumer acceptance of mochi-based products (Ciapini et al., 2020). The use of Japanese glutinous rice flour likely contributed to this desirable texture due to its high amylopectin content, which is known to enhance chewiness and elasticity (Wang et al., 2021).

Moreover, the balance between the softness of the mochi and the frozen sour turmeric ice cream core provides a textural contrast that enhances the sensory experience. Such contrast is considered favorable in frozen desserts, as it increases mouthfeel complexity and overall product satisfaction (Choi & Lee, 2020). In conclusion, the high acceptability of the texture indicates that the product formulation and production method are technologically sound and consumer-friendly, contributing positively to the overall impression of the mochi dessert.

4.6. Overall Impression

Tabel 5. Overall Impression Mochi Beras Kencur Isi ice cream Kunyi Asam

	Scale	Amount	Score	%
Overall Impression	1	0	0	0%
	2	0	0	0%
	3	1	3	2%
	4	12	48	32%
	5	17	85	57%
Total			136	91%

The results in Table 5 show that the overall impression of the kencur rice mochi filled with sour turmeric ice cream was highly positive. Most untrained panellists rated the product on the highest hedonic scale of 5 (“strongly like”), accounting for 57% of total responses. A

further 32% rated the product as “like” (scale 4), and 2% rated it as “neutral” (scale 3). No panellists rated the product negatively (scale 1 or 2), indicating zero negative perception among the sample group. This high level of acceptance suggests that the product formulation was successful in terms of taste, texture, aroma, and presentation, which are known to significantly influence consumer preferences in sensory studies (Meilgaard, Civille, & Carr, 2015). The combination of traditional herbal Flavors, such as beras kencur and kunyit asam, with a familiar dessert format like mochi, appears to enhance both cultural relevance and sensory appeal (Wulandari & Putri, 2023).

The results align with previous studies emphasizing the potential of integrating traditional functional beverages into contemporary food products to increase market acceptability and support cultural food innovation (Nurhayati, Yuliani, & Mahendrawati, 2021). Furthermore, the frozen filling in the form of turmeric-tamarind ice cream offers a novel and refreshing contrast to the chewy mochi texture, possibly enhancing the overall eating experience. These findings demonstrate that traditional ingredients, when combined with modern food trends like ice cream-filled mochi, can yield highly acceptable and innovative products that appeal to modern consumers while preserving cultural heritage

5. CONCLUSIONS

The development of this mochi product was carried out by replacing the liquid ingredients used in making mochi with a traditional Indonesian drink, namely herbal medicine nasi kencur. The starting recipe used as a reference in this experiment was made by collecting 10 recipes from various sources, then analyzing them to find 1 recipe that would be tested to produce a good product for QDA testing on expert panelists. Testing of the kencur rice mochi product was carried out 2 times. P1 produces mochi that is less chewy due to the rice content contained in the kencur rice herbal medicine, in P2 the researchers added 100 ml of kencur rice herbal liquid so that the kencur rice mochi has the right elasticity according to the reference product/starting recipe that has been made. The acceptability or level of liking for this kencur rice mochi product filled with sour turmeric ice cream is very favorable in terms of appearance, color, taste, texture and overall impression because it can be seen from the percentage produced, namely >85%. Meanwhile, in terms of aroma, the percentage value is 83%, which means that people like the product.

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