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by Yosua Lucky

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Formulation of Turmeric-Tamarind Jelly Using Psyllium Husk

Yosua Lucky Chandra
Akademi Kesejahteraan Sosial Ibu Kartini Semarang

Esteria Priyanti
Akademi Kesejahteraan Sosial Ibu Kartini Semarang

Address: Jl Sultan Agung No. 77, Gajahmungkur, Kota Semarang
Corresponding Author: esteria@aksibukartini.ac.id

Abstract. *The objectives of this study were: 1) to determine the acceptance of color, aroma, texture, and taste of turmeric-tamarind jelly candy with the addition of psyllium husk; and 2) to identify the composition of the selected turmeric-tamarind jelly candy product. The research employed experimental methods, hedonic tests, and ranking tests. Three variants of psyllium husk were used: Product 1 with 1 g, Product 2 with 3 g, and Product 3 with 5 g of psyllium husk added. Data obtained from sensory evaluations were descriptively analyzed using Microsoft Excel 2019. Results indicated that the turmeric-tamarind jelly candy with the addition of 1 g of psyllium husk was the most preferred and well-received product. The composition of the selected jelly candy included 150 ml of turmeric-tamarind extract, 60 g of sugar, 60 g of glucose, 21 g of gelatin, and 1 g of psyllium husk.*

Keywords: *Turmeric-tamarind, Jelly Candy, Psyllium Husk*

BACKGROUND

Jelly candy is a chewy confectionery made from fruit or vegetable juices, water, sugar, and gelling agents. These gelling agents can include gelatin, agar, pectin, gum, starch, or carrageenan. The purpose of using gelling agents in jelly candy production is to modify the texture, thereby creating a chewy jelly candy product.

Studies on the development of jelly candy have been conducted using various vegetable juices, fruit extracts, spice extracts, and a range of gelling agents to produce new jelly candy variations. For instance, in 2019, jelly candy products were developed using mango ginger (Curcuma mangga Val.) extract with different concentrations of gelatin (Dhiyani, 2019), and sweet leaf bush jelly candy with the addition of ginger (Zingiber officinale) (Susanti et al., 2019). In 2020, jelly candy products were developed utilizing carrot extract (Daucus carota L.) and golden kiwi juice (Actinidia deliciosa) (Cornelia & Nathania, 2020), as well as soy milk jelly candy with the addition of eggshell powder (Novelina et al., 2020). In 2021, studies produced ginger extract jelly candy with the substitution of red guava extract intended for diabetes mellitus patients (Nursakinah & Verawati, 2021), along with the "Previmin" multivitamin mineral jelly candy aimed at preventing stunting (Ryveka et al., 2023). Given these advancements, there is a need to explore the development of jelly candy using turmeric and psyllium husk as a gelling agent.

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* Yosua Lucky Chandra, esteria@aksibukartini.ac.id

Turmeric-tamarind drink is made from turmeric rhizomes, tamarind fruit, water, sugar, and optionally lime juice or betel leaf extract. This beverage can be categorized as "jamu" (traditional herbal medicine) due to its beneficial biological activities for health (Suhermin Ingsih et al., 2020). The liquid texture of turmeric-tamarind drink makes it versatile for incorporation into various food products, including jelly candy.

Psyllium husk is recognized as a natural fiber source derived from the Plantago ovata plant. Its high fiber content offers significant health benefits. Supplementation with psyllium husk is advantageous for digestive health, preventing constipation, managing blood cholesterol levels, maintaining blood sugar levels, and aiding in weight loss (Waheed Khan et al., 2021). Psyllium husk shows potential for use in the development of various food products. Commonly, psyllium husk is added to breakfast cereals, meal replacements, bread, biscuits, fruit juices, yogurt, soups, and ice cream (Katke et al., 2020). When psyllium husk powder is incorporated into food products, it absorbs water, resulting in a thicker and chewier texture. This property makes psyllium husk valuable for improving the texture of food products (Shah et al., 2020).

Based on this background, the author undertook the development of jelly candy using turmeric-tamarind and psyllium husk as the primary ingredients. These components are rarely used in jelly candy production, especially psyllium husk, which was employed as a gelling agent in this study. Additionally, both ingredients are readily available at affordable price. The turmeric-tamarind jelly candy formulated with psyllium husk is expected to become a novel product favored by consumers. The objectives of this study are: 1) to evaluate the acceptance of the color, aroma, texture, and taste of turmeric-tamarind jelly candy with the addition of psyllium husk; and 2) to determine the composition of ingredients in the selected jelly candy product.

METHOD

The ingredients used for the experimental formulation of turmeric-tamarind jelly candy included turmeric, tamarind, water, granulated sugar, salt, glucose, gelatin, and psyllium husk. The equipment utilized in the process comprised a digital scale, measuring cups, spoons, ladles, knives, cutting boards, pots, stoves, strainers, and jelly candy molds. This study employed experimental methods, including hedonic and ranking tests. The experimental production of turmeric-tamarind jelly candy was conducted at the Culinary Arts Laboratory of the AKS Ibu Kartini, located at Jalan Sultan Agung No. 77, Gajah Mungkur Village, Gajah Mungkur District, Semarang City.

The initial stage of the experiment involved the preparation of turmeric-tamarind extract. The composition of the extract included 600 ml of water, 100 g of turmeric, 50 g of tamarind, and 5 g of salt. The process began with cleaning and washing the turmeric rhizomes, followed by draining and crushing the rhizomes. Next, the crushed turmeric rhizomes were boiled in water at a temperature of 100°C. The rhizomes were boiled together with tamarind and salt for 15 minutes. The next step was to strain the mixture to produce turmeric-tamarind extract. This extract was then used as the base ingredient for the jelly candy formulation.

The subsequent stage involved the production of turmeric-tamarind jelly candy with the addition of psyllium husk. The composition of the ingredients for turmeric-tamarind jelly candy with added psyllium husk is detailed in Table 1. The process for making this jelly candy is illustrated in Figure 1.

Table 1. Ingredient Composition of Turmeric-Tamarind Jelly Candy with Added Psyllium Husk

Materials	Product 1	Product 2	Product 3
Turmeric-Tamarind (ml)	150	150	150
Sugar (g)	60	60	60
Glucose (g)	60	60	60
Gelatin (g)	21	21	21
Psyllium Husk (g)	1	3	5

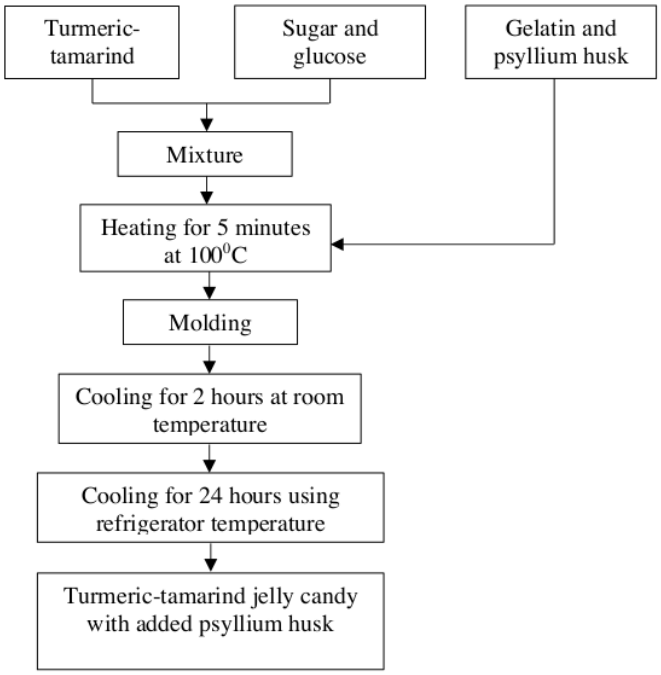

Figure 1. Production Flowchart

This study involved 35 untrained panelists to conduct the hedonic test. The hedonic test was utilized to assess the acceptance of the aroma, color, texture, and taste of the turmeric-tamarind jelly candy with added psyllium husk. The ranking test was employed to select the best product among the three samples. The hedonic test was administered using a 7-point hedonic scale questionnaire with the following ratings: "strongly dislike," "dislike," "somewhat dislike," "neither like nor dislike," "somewhat like," "like," and "strongly like." The rating "strongly dislike" was assigned a score of 1, "dislike" was assigned a score of 2, "somewhat dislike" was assigned a score of 3, "neither like nor dislike" was assigned a score of 4, "somewhat like" was assigned a score of 5, "like" was assigned a score of 6, and "strongly like" was assigned a score of 7. The sensory data collected from the hedonic tests were analyzed descriptively using Microsoft Excel 2019.

RESULT AND DISCUSSION

The average acceptance scores for the color, aroma, texture, and taste of the turmeric-tamarind jelly candy with added psyllium husk are presented in Table 2. The images of the three products of turmeric-tamarind jelly candy with added psyllium husk can be seen in Figure 3.

Table 2. Average Panelist Acceptance Scores for Turmeric-Tamarind Jelly Candy with Added Psyllium Husk

Product	Color	Aroma	Texture	Taste
Product 1	4.23	3.83	4.30	4.11
Product 2	4.14	4.00	4.00	4.06
Product 3	3.74	3.91	3.63	3.83

Figure 2. Turmeric-Tamarind Jelly Candy Products with Added Psyllium Husk
(From left to right: Product 1, Product 2, Product 3)

Color

Based on Table 2, Product 1 had the highest average score for the color acceptance of the turmeric-tamarind jelly. Therefore, it can be concluded that increasing the amount of psyllium husk led to a decrease in the panelists' preference for the color of the jelly candy. candy. The average score was 4.23±1.21, falling within the range of "moderately like" and approaching "somewhat like." In contrast, Product 3 had the lowest average score of 3.74±1.07, which falls between "somewhat dislike" and approaching "moderately like."

The panelists preferred the color of the jelly candy with the addition of 1 g of psyllium husk because it produced a yellow and transparent appearance. This color was brighter compared to the other products. The yellow hue in the jelly candy was attributed to the use of turmeric. As the amount of psyllium husk increased, the jelly candy's color became less transparent and displayed fine fiber strands. Therefore, it can be concluded that increasing the amount of psyllium husk led to a decrease in the panelists' preference for the color of the jelly candy.

Aroma

The highest average score for aroma acceptance of turmeric-tamarind jelly candy was observed in Product 2. The average score obtained was 4.00±0.84, falling within the range of "moderately like" approaching "somewhat like." Conversely, the lowest average score for aroma acceptance was found in Product 1, with an average score of 3.83±0.98, falling between

"somewhat dislike" and approaching "moderately like." Overall, the aroma produced by all three products was characterized by turmeric-tamarind aroma, with no significant differences noted among the aromas of the three products.

Texture

Product 1 had the highest average score for texture acceptance. The average score obtained was 4.31±1.01, falling within the range of "moderately like" approaching "somewhat like." Conversely, the lowest average score for texture acceptance of the jelly candy was found in Product 3. This product had an average score of 3.63±0.84, falling between "somewhat dislike" and approaching "moderately like."

Panelists favored the texture of the turmeric-tamarind jelly candy with the addition of 1 g of psyllium husk because it was overall firm, chewy, and non-sticky when chewed. However, the jelly candy with 5 g of psyllium husk had a less firm and less chewy texture, which was not preferred by the panelists.

Taste

The highest average score for taste acceptance of the turmeric-tamarind jelly candy was observed in Product 1. This product had an average score of 4.11±1.02, falling within the range of "moderately like" approaching "somewhat like." Conversely, the lowest average score for taste acceptance was found in Product 5. This product had an average score of 3.83±0.82, falling between "somewhat dislike" and approaching "moderately like."

Panelists liked the taste of the turmeric-tamarind jelly candy with the addition of 1 g of psyllium husk because it had a balanced sweetness and the distinct taste of turmeric-tamarind. The addition of psyllium husk did not significantly affect the turmeric-tamarind taste; therefore, panelists preferred Product 1.

Ranking Test

Based on the analysis, the turmeric-tamarind jelly candy product most preferred by the panelists was the one with the addition of 1 g of psyllium husk. A total of 63% (22 panelists) ranked this product in first place.

CONCLUSION AND RECOMMENDATION

1. The turmeric-tamarind jelly candy with the addition of 1 g of psyllium husk is the most preferred and well-received product.
2. the selected composition of ingredients for the jelly candy consists of 150 ml of turmeric-tamarind extract, 60 g of sugar, 60 g of glucose, 21 g of gelatin, and 1 g of psyllium husk.

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