



INNOVATION IN MAKING SNACK BARS WITH INDONESIAN FLAVOR WITH MOLECULAR GASTRONOMY

**Nicholas Andrew Widjaya, Muhammad Rakhi Bayhaqi, Rudy Pramono, and Rosianna
Sianipar**

Pelita Harapan University, Indonesia

Corresponding author: rudy.pramono@uph.edu

Abstract

This research aims to develop flavor innovations for snack bars using Nusantara flavors and molecular gastronomy methods. So that it not only functions as a healthy snack but also can offer a culinary experience while still maintaining its nutritional content. In general, the flavors in snack bars are only chocolate, cheese, and fruit flavors. Still, in this study, the flavors used are the flavors of the archipelago where the flavors chosen are the ayam pop flavor originating from West Sumatra and also the grontol jagung flavor originating from Central Java. The research method used is a product development method in which existing products are developed again from aroma, taste, texture, and color with organoleptic testing consisting of hedonic quality tests to 3 expert panelists and hedonic tests to 32 general panelists. The results of this study indicate that snack bar innovation with archipelago flavors can be applied with molecular gastronomy, namely the dehydrate technique. But when viewed based on the aspects of taste, texture, color, and aroma, the taste of grontol jagung is superior with an average of 4.39. So that this innovation not only produces unique flavor variants but also can produce quality snack bars and does not eliminate the nutritional content. It is hoped that the results of this study can be a breakthrough and innovation by applying the flavors of the archipelago in a healthy snack.

Keywords: Culinary, indonesia flavors, innovation, molecular gastronomy, snack bar

INTRODUCTION

Indonesia has diverse wealth from religion, race, ethnicity, and culture. And the cultural wealth that is the identity of this nation requires efforts to preserve and develop (Hakim & Hamidah, 2022). One aspect of Indonesia's cultural diversity that needs to be preserved is culinary wealth, especially traditional Nusantara cuisine. This traditional culinary is a cultural heritage that reflects the richness of flavors and diversity of local raw materials, where each region has unique culinary characteristics.

The uniqueness includes cooking techniques, types of spices, presentation, and more. (Wijaya, 2019). In addition, Indonesia is famous for its rich culture and natural resources, which have a variety of culinary heritages. Indonesia is also called the "Mother of Spices" due to the diversity and abundance of these spice resources. These spices are what make the distinctive taste of the archipelago in every Indonesian dish. One of Indonesia's culinary heritages is ayam pop and grontol jagung. Ayam pop is one of the typical dishes from Minangkabau, West Sumatra, which is known for its simple yet delicious taste. Chicken pop has a savory and light taste with a simple

combination of spices, but can create a complex flavor. Ayam pop is often served in traditional events or special gatherings to fill a cultural tradition event. While grontol jagung is a traditional Indonesian food made from corn, this food originates from Java, especially Yogyakarta and Central Java. The taste offered by grontol jagung is very simple, a combination of sweetness from the corn and savory taste from grated coconut that can offer a unique combination of flavors. This food is commonly used as a snack or light meal that can be served in a traditional event. So the use of this archipelago flavor is suitable to be combined with snack bars. Because these two flavors have a simple yet complex taste, it does not spoil the taste of the snack bar itself.

Developments in the food and beverage industry continue to progress every year. The Central Bureau of Statistics (BPS) noted that the food and beverage industry in Indonesia has increased from 2020 to 2021 by 2.54 percent DJKN (Ministry of Finance, 2022). This has led to innovation in exploring the flavor, texture, and presentation of food in new ways. One method that can change the shape of food and beverages to make them look more attractive by utilizing modern techniques is molecular gastronomy. Molecular gastronomy is a branch of science that studies the transformation of food during the cooking process with the help of chemicals. In addition, molecular gastronomy is a modern processing technique that consists of aspects of taste, food texture, and appearance of a food (Natalia 2014).

Healthy snacks are foods that contain adequate and balanced nutritional components that can meet health criteria and, when consumed, do not pose a risk of disease or poisoning, and contain substances needed by the body (Novianti, 2018). One of the healthy snacks that is practical and has complete nutrition is a Snack bar (Sari, 2016). Snack bars are bar-shaped snacks made from cereals or nuts. Snack bars are favored because of their good taste, easy and practical presentation, that they have a high nutritional content (Pradipta, 2011).

Today, snack bars are well known in the community, but most snack bars on the market today only offer a limited selection of flavors and tend to be monotonous, such as chocolate, cheese, or fruit flavors. These limited flavor options not only limit the consumer experience but also reduce the potential for richer and more interesting flavor variations. It can be seen from brands that are quite well-known in the community such as Fitbar and Soyjoy, two snack bar brands that are quite popular in Indonesia, with both offering products that focus on healthy lifestyles and have advantages in terms of promoting healthy lifestyles. However the drawback of these two brands is that the choice of flavors offered is still limited and less diverse, so there are no snack bar products that use the flavors of the archipelago.

So this research aims to create innovations and breakthroughs by presenting snack bars that not only function as part of a healthy snack but can also offer a more in-depth culinary experience combined with the flavors of the archipelago while maintaining the nutritional value and quality of the product. The use of ayam pop and grontol jagung flavors also gives this snack bar product a unique taste, because these two archipelago flavors have simple but complex taste characteristics. And snack bars also have the meaning of simple and light food but with a variety of compositions. So when combined, it makes snack bar products have unique characteristics, simple, but the flavors and compositions offered are very complex. This innovation not only enriches the choice of flavors in the market but can also help the needs of consumers who want a variety of new and unusual flavors. This makes it a relevant product for consumers who are looking for innovation and different flavors in every snack they choose. This could be a great potential to combine snack bars with diverse archipelago flavors using the molecular gastronomy method. So that it can present a combination of authentic archipelago flavors in a more modern way, while still maintaining the nutritional value and quality of the snack bar itself.

RESEARCH METHOD

This research uses a product development research method. Product development research is research on existing products to be developed again in terms of aroma, taste, texture, and color while maintaining their quality so that they have a higher use value and are more attractive to consumers. This research will discuss the innovation of snack bars with archipelago flavors with molecular gastronomy. Tests will be conducted to determine the aroma, taste, texture, and color of snack bars with archipelago flavors. The snack bar product will be tested with an organoleptic test, which is a test that uses the five senses to assess the quality of a product which consists of aspects of aroma, taste, texture, and color. (Anggraini et al., 2017). Including the hedonic quality test and hedonic test, the hedonic test is a test to measure the level of liking or preference of consumers or general panelists for a product using a Likert scale 1: strongly dislike, 2: dislike, 3: quite like, 4: like, and 5: strongly like.

This test uses a quantitative approach using a survey using a questionnaire distributed to consumers. The hedonic quality test is a test that assesses the quality of each product from the aspects of aroma, taste, texture, and color and this test is carried out to expert panelists. This test uses a qualitative approach using direct interviews with culinary experts which includes testing aroma, taste, texture, and color where the results of the experts are analyzed to determine the evaluation and input on the innovation of this snack bar.

The population in this study are people who have expertise in the culinary field and also have an interest in consuming snack bars. The sample selection method used is purposive sampling where the sample is selected based on certain criteria. So researchers get 32 general panelists and also 3 expert panelists. The collected data were analyzed using qualitative and quantitative approaches. Quantitative data derived from consumer surveys were analyzed through descriptive statistical techniques with calculated averages from the aspects of aroma, taste, texture, and color. Meanwhile, qualitative data from the interviews were analyzed using the descriptive analysis method in which the researchers described each answer from the experts. The results of this analysis became an evaluation and assessment to continue to improve the quality of this snack bar.

RESULT AND DISCUSSION

This product design includes the process of making snack bars and also the use of archipelago flavors, namely ayam pop and grontol jagung flavors. This first product is a snack bar that has soft, slightly crunchy, and sweet specifications. This snack bar has an attractive color appearance due to the combination of the composition used.

Table 1. Snack Bar Recipe

Snack Bar		
Ingredient	Quantity	Unit
Trial mix (almonds, sunflower seeds, dried cranberries, pumpkin seeds)	250	Grams
Rice puff	250	Grams
Honey	25	MI
Rice syrup	20	MI

Instructions:

1. Combine all the ingredients place them in a tray, put it in the freezer or chiller, and wait for all the ingredients to combine perfectly.3. Knead the dough until smooth and elastic, then let it rest for 15 minutes to make it easier to shape. Cover the dough with a damp cloth to prevent it from drying out.

Source: Data Proccesing (2024)



Figure 1. Snack Bar
Source: Data Processing (2024)

The second product made is ayam pop which is used as an archipelago flavor that will be combined with snack bars. This ayam pop flavor has a savory taste from the use of coconut milk and other spices is also slightly sweet from the use of coconut water and also has a pale white color.

Table 2. Ayam Pop Flavor Recipe

Snack Bar		
Ingredient	Quantity	Unit
Garlic	15	Grams
Shallots	10	Grams
Ginger	2	Grams
Galangal	2	Grams
Bay leaf	3	Pcs
Citrus leaf	3	Pcs
Lemongrass	1	Pcs
Coconut water	1000	ML
Coconut milk	200	ML
Salt and sugar	5	Tsp

Chicken	1000	Grams
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Instructions:

1. Combine all ingredient into a pot, then cook for about 1 hour until cooked.
2. Then add salt and sugar.
3. Once finished puree the ayam pop with a blender adn place it on a tray that has been given a base and put it in a dehydrator machine and wait for approximately 2 days.
4. When finished mix the snack bar that has been made and make sure all parts of the snack bar are coated.

Source: Data Proccesing (2024)



Figure 2. Ayam Pop Flavor
Source: Data Processing (2024)

The third product made is grontol jagung which is used as an archipelago flavor that will be combined with snack bars. This grontol jagung flavor has a savory taste from the use of coconut milk and grated coconut and a sweet taste from the use of coconut water and corn itself and also has a bright yellow color.

Table 3. Grontol Jagung Flavor Recipe

Snack Bar		
Ingredient	Quantity	Unit
Sweet corn	500	Grams
Coconut water	500	ML
Coconut milk	100	ML
Salt and sugar	5	Tsp
Pandan leaf	2	Pcs

Bay leaf	2	Pcs
Grated coconut	100	Grams

Instructions:

1. Boil sweet corn with coconut water and coconut milk, add bay leaf and pandan leaf.
2. Then add salt, sugar, grated coconut, and wait until cooked.
3. Once cooked so puree the grontol jagung with a blender and place it on a tray that has been given a base put it in a dehydrator machine and wait for approximately 2 days.
4. When finished mix the snack bar that has been made and make sure all parts of the snack bar are coated.

Source: Data Proccesing (2024)



Figure 3. Grontol Jagung Flavor
Source: Data Processing (2024)

The fourth product made is ayam pop chili sauce which is used as an addition to the ayam pop flavor that has been made. This ayam pop chili sauce has a savory, spicy, slightly sweet taste, and also has a bright red color.

Table 4. Chili Ayam Pop Recipe

Snack Bar		
Ingredient	Quantity	Unit
Shallots	15	Grams
Garlic	10	Grams
Shrimp paste	2	Grams

Salt and sugar	5	Tsp
Tomato	10	Grams
Curly chili	12	Grams
Cayenne pepper	6	Grams
Ayam pop broth	200	ML

Instructions:

1. Boil shallots, garlic, tomatoes, curly chili, cayenne pepper.
2. Then puree all the ingredient that have been boiled.
3. Add ayam pop broth, shrimp paste, and seasoning.
4. After that, put it on a tray that has been given a base put it in a dehydrator machine, and wait for about 2 days
5. When finished mix the snack bar that has been made and make sure all parts of the snack bar are coated.

Source: Data Proccesing (2024)



Figure 4. Chili Ayam Pop
Source: Data Processing (2024)

After conducting product trials, then conduct an organoleptic assessment consisting of hedonic quality tests to 3 expert panelists and hedonic tests to 32 general panelists.

Table 5. Hedonic Quality Test Results of Snack Bar

No	Question	Expert Panelist Answer
1.	Testing the aspects of aroma, taste, texture, and color (For 2 flavors)	According to the chefs, the texture of the ayam pop and grontol jagung flavored snack bars was good enough. In addition, the aspect needs to be improved, especially for the ayam pop flavor, because the color is still not by ayam pop in general. In terms of taste, both snack bars are quite authentic to the spices used. By still paying attention to the balance of flavors from each variant so that no one is too dominant. The aroma of these snack bars is also quite good, considering that the selected flavor variants have a mild aroma, so they are not too strong.
2.	Ayam Pop Flavor Special Question	According to the chefs, the ayam pop flavor in this snack bar is almost authentic, as the savory taste of the coconut and chicken is pronounced, coupled with a slightly spicy taste from the ayam pop chili sauce that is quite strong. In this ayam pop flavor variant, the seasoning and flavor ratio is quite balanced, although it tends to be more dominant in savory flavors. So there needs to be an adjustment to create a balance of flavors with the snack bar.
3.	Grontol Jagung Flavor Special Question	According to the chefs, this grontol jagung flavored snack bar has a similar taste to the original grontol jagung. The sweetness of the corn and the savory taste of the grated coconut are very clear. The combination of corn, coconut water, grated coconut milk, and a hint of pandan aroma makes the flavor of grontol jagung just right. No flavor is too dominant or excessive. The chef also gave input that in the future the use of corn should be more, to produce a more dominant corn flavor.
4.	Additional Questions (packaging design, practicality, and overall impression)	According to the chefs, the packaging design is good enough, considering that these snack bars are still produced by home and not by big industries. However, the practicality of the packaging still needs to be improved, as opening it requires a bit of effort or tools such as scissors. Overall, our impressions as testers were quite positive, especially in terms of the taste and texture of the snack bar combined with the authentic taste of the archipelago, making it unique and interesting. The feedback from us as chefs is that there is a need for a little improvement in the flavors used to make them stand out, as well as maintaining the texture and composition of the snack bar which is already quite good. For the packaging, there might need to be improvements if it is to reach a higher level, considering that consumers tend to prioritize convenience and practicality in the products they buy.

Source: Data Processing (2024)

Therefore, the next step is to conduct hedonic tests on the aspects of taste, aroma, color, and texture for 32 general panelists.

Table 6. Hedonic Test Result

Hedonic Test Result		
Assessment	Ayam Pop	Grontol Jagung
Flavor	4,22	4,50
Texture	3,84	4,22
Color	3,31	4,47
Aroma	4,16	4,38
Average	3,88	4,39

Likert scale	Quite Like	Like
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Source: Data Proccesing (2024)

Analysis of the preferences of 32 consumers showed that the grontol jagung snack bar was overall preferred. With an average Likert scale score of 4.39, grontol jagung excelled in all aspects, including taste (4.50), texture (4.22), color (4.47), and aroma (4.38). Compared to ayam pop which had an average score of 3.88, these results indicate that consumers prefer the taste, texture, color, and aroma profiles of grontol jagung. Although ayam pop still gets a pretty good assessment, especially in the aspects of aroma (4.16), taste (4.22), texture (3.84), and color (3.31), ayam pop still needs to be improved again to get maximum results.

The final result is a snack bar product that has been combined with the flavors of the archipelago.



Figure 5. Snack Bar with Grontol Jagung Flavor
Source: Data Processing (2024)



Figure 6. Snack Bar with Ayam Pop Flavor
Source: Data Processing (2024)



Figure 7. Final Product
Source: Data Processing (2024)



Figure 8. Final Product
Source: Data Processing (2024)

CONCLUSIONS AND IMPLICATIONS

Based on the results of two product trials, it can be concluded that the innovation of snack bars with archipelago flavors can be applied with molecular gastronomy techniques. The technique that researchers use is the dehydrate technique, which is used in the process of making archipelago flavors to help reduce the water content in the archipelago flavors used. So that when combined with a snack bar, this product becomes a unique innovation because it presents an archipelago flavor snack bar product with modern techniques.

The hedonic test and hedonic quality test conducted on two snack bar flavors, namely ayam pop and grontol jagung, concluded that these two variants succeeded in providing a unique taste experience. The ayam pop variant has a savory taste that comes from spices such as garlic, ginger, galangal, and others. The balance of savory, sweet, and slightly spicy flavors with its crunchy and soft texture. On the other hand, the grontol jagung flavor variant has a sweet and slightly savory taste with the use of spices in it making the taste stronger. In terms of packaging, this snack bar is quite attractive and practical, making it easier for consumers to open and enjoy the product. So that makes this product worth considering by consumers who are looking for snack bars with unique flavors and quality.

So overall, the results of this trial show that the innovation of making snack bars with archipelago flavors using molecular gastronomy techniques not only provides a wider variety of flavors, but also still produces quality products from the aspects of aroma, taste, texture, and color.

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