

INNOVATION OF ORGANIC YELLOW PUMPKIN BROWNIES WITH A MIXTURE OF GINGER AND CINNAMON HERBAL AS A BUSINESS OPPORTUNITY IN THE HEALTHY FOOD INDUSTRY

Linda Farikhatul Muti^{1*}, Dyan Naffisa Prissilawaty², Kharis Fadlullah Hana³

^{1,2,3} Sharia Business Management Study Program, Faculty of Islamic Business Economics, UIN Sunan Kudus, Indonesia

*Corresponding author: linda.secret11@gmail.com

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Abstract

This research aims to develop healthy food product innovations based on organic yellow pumpkin brownies with the addition of herbal ginger and cinnamon. This innovation responds to the growing trend of healthy eating and the demand for functional snacks made from local ingredients. The method used is Research and Development (R&D) with six stages, including problem collection, data collection, product design, validation, trial, and product revision. The validation results by informants (nutrition students, biology, small to medium owners, and potential consumers) showed a positive response to the taste, texture, and health benefits of the product. Several improvements have been suggested, including the use of healthier alternatives such as stevia and gluten-free flour. Product trials indicate that consumers appreciate the unique flavor with a spicy aroma and eco-friendly packaging. This product demonstrates strong potential as an innovative healthy snack and a promising business opportunity in the local healthy food industry.

Keywords: Yellow Pumpkin Brownies; Herbal Additions; Healthy Foods; Ginger; Cinnamon.

INTRODUCTION

The food and beverage industry plays an important role in Indonesia's economy (Megavitry et al., 2024). Central Statistics Agency (BPS) reported that Gross Domestic Product (GDP) growth in the food and beverage industry increased from 5.82% year on year in the third quarter of 2024 to 6.35% year on year in the fourth quarter of 2024 (Central Statistics Agency, 2025). Along with the growth of the contribution of the food and beverage industry, public awareness of the importance of healthy food and beverage consumption is also increasing (Hartini & Malahayatie, 2024), because it is considered healthier, safer, and more environmentally friendly (Arifin et al., 2021). However, healthy food is often difficult to find in the market, so consumers tend to choose fast food that is easy to obtain, practical, and available anywhere (Pratidina et al., 2024). Yellow pumpkin (*Cucurbita moschata*) is one of the fruits that can be used as a processed alternative organic food (Dewi et al., 2023). Yellow pumpkin rich in nutrients with high amounts of β -carotene, vitamins B and C, and other essential nutrients such as carbohydrates, protein, fiber, and minerals. Its moisture content reaches around 91.2%, making it a tender and juicy fruit (Putri et al., 2024).

Increasing the added value of yellow pumpkin and supporting the government's food diversification program can be achieved by processing yellow pumpkin into various types of food products (Millati et al., 2020). In addition, ginger and cinnamon are herbal plants that have various health benefits. Ginger is one of the plants whose use has the potential to be adjuvant in the treatment of mild flu and helps stimulate the human immune system (Safrida et al., 2022). Ginger also contains gingerol and shogaol, which have anti-inflammatory properties, and can relieve menstrual pain by inhibiting enzymes that cause inflammation and uterine contractions. Meanwhile, cinnamon has antimicrobial, anti-inflammatory, and antispasmodic properties. Its cinnamaldehyde and eugenol content help reduce inflammation and pain. Cinnamon essential oil is also beneficial for relieving joint pain, improving circulation, and relaxing tense muscles, including during menstruation (Munifah et al., 2023).

Brownies are one of the most sought-after cakes and are easy to get by the public (Haidiyanti et al., 2025). Brownie products come in various flavors from different brands with various flavor variants, such as chocolate, cheese, and pandan. However, innovations that

prioritize nutritional aspects through the use of natural ingredients are still very limited. The development of brownies with better nutritional content is very important, especially for people who have a sweet tooth, but still pay attention to health aspects (Riandy et al., 2022).

Yellow pumpkin can be one of the potential additions to brownie products that contain many nutrients, are low in fat, and contain high inulin and dietary fiber, with a distinctive aroma and taste. Research Dewi et al. (2023) mentioned that the addition of yellow pumpkin to baked brownies has a very real effect on moisture content, sugar content, color, aroma, texture, and taste. In addition, the research Sholin et al. (2022) It also mentioned that the addition of yellow pumpkin puree and black glutinous rice flour had an effect on ash content, moisture content, β -carotene, bleaching β -carotene, hedonic (color, taste, aroma, texture, and overall acceptance) and score (texture). According to Putri et al. (2024), pumpkin brownie products have the potential to be a functional food. Organic yellow pumpkin brownies innovation with addition herbs ginger and cinnamon can be an attractive business opportunity. With this concept, brownies not only taste good, but also more nutritious and have a high selling value in the healthy food industry.

RESEARCH METHODS

Research Type and Design

This research used Research and Development (R&D). The R&D method was chosen because it was able to produce a new product to improve an existing product (Zakariah et al., 2020). The development process follows innovative design principles and functional approaches to create healthy snacks that are in line with current market trends (Waruwu, 2024). In this study, only 6 stages are used as follows.

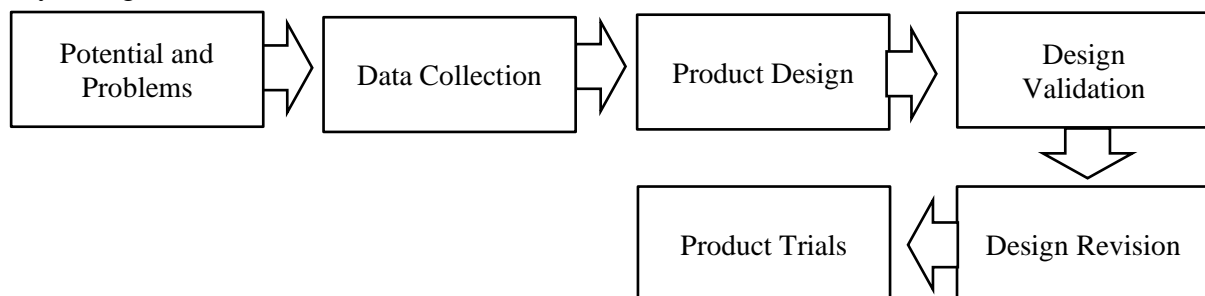


Figure 1. R&D Research Flow
Source: Torang Siregar, 2023

Research Location and Time

This research was carried out in Kudus, Central Java, from February to May 2025. The main ingredients in this study include organic yellow squash (*C. moschata*), ginger, cinnamon, wheat flour, eggs, and other additives for making brownies. The stages of product manufacturing include:

1. The process addition of ginger and cinnamon herbs.
2. Formulation of brownie dough recipes and formulations.
3. The process of product testing and organoleptic evaluation based on taste, aroma, texture, and visual appearance.

Data Analysis Techniques

Qualitative descriptions were obtained from interviews, validations, and product trials. This analysis aimed to determine the extent to which the product innovation is accepted by the community, the consumer response to the product, and its potential to be developed as a business. The data were also used to refine the product formulation. Nutritional validation was carried out by students from the Nutrition Study Program to ensure that the product has functional value.

RESULTS AND DISCUSSION

Potential and Problems

Organic yellow pumpkin brownie product with the addition of ginger and cinnamon herbs have great potential to be developed as a healthy food and business opportunity. But behind this potential, there are still several challenges that need to be overcome. The composition of ingredients such as margarine, sugar, and wheat flour still does not fully support the concept of healthy food. In addition, herbs such as ginger and cinnamon have a strong taste and are not necessarily suitable on everyone's tongue, so it needs to adapt the taste so that it can still be accepted by the market. The researchers are trying to create a business canvas model (BMC) for the innovation of organic yellow pumpkin brownie products with a mixture of herbal additions cinnamon and ginger as a reference in the business that wants to be designed in the future. The BMC of brownie innovation products is as follows.

Table 1. BMC Organic Yellow Pumpkin Brownie Products with Cinnamon and Ginger Herbal Addition

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Key Partners	Key Activities	Value Proposition	Customer Relationships	Customer Segments
Yellow pumpkin farmers, middleman (collectors) of yellow pumpkins, suppliers of production materials, owners of souvenir shops in Kudus, marketplaces	Buying yellow pumpkin harvest from farmers, product R&D, brownie production, digital marketing, and quality control	Provide modern brownies with organic raw materials and herbal ingredients	Always connected with social media such as Instagram and WhatsApp, actively participating in events, discounts and promos to souvenir shops, loyalty programs.	Consumers who care about a healthy lifestyle, customers of souvenir shops in Kudus, online buyers through marketplaces, organic and herbal food communities, and dieters.
	Key Resources		Channels	
	Organic raw materials (yellow pumpkin, ginger, cinnamon), innovative recipes from R&D results, production equipment, production and marketing teams, social media accounts, and online stores in the marketplace.		Distribution is carried out through local souvenir shops in Kudus, marketplaces, social media (Instagram, WhatsApp), and promotional events at bazaars and healthy food festivals.	
Cost Structure		Revenue Streams		
Organic raw material purchase costs, production costs, digital marketing and advertising costs, as well as logistics and shipping costs.		Direct sales of brownies in souvenir shops and marketplaces, sales when participating in bazaars or exhibitions, as well as potential collaborations with other healthy food brands.		

Source: Processed Data, 2025

Data Collection

Table 2. Informant Data

Category Information	Sum	Name of the Informant
Nutrition Student	1	Irma Hestin Pribadi
Biology Student	1	Rana Rosida
Potential Consumers	3	Ali, Eva, Yanti
Brownie Seller	1	Nurhayati

Source: Informant Data Interviews, 2025

The interviews revealed that the informants generally responded positively to the healthy brownies made with yellow pumpkin, ginger, and cinnamon. The combination of these ingredients was considered interesting, as it not only provides a distinctive taste but also offers notable health benefits. Yellow pumpkin is considered suitable as the main ingredient because it is rich in nutrients such as β -carotene and fiber, and has a natural sweetness that can help reduce the amount of added sugar. Ginger and cinnamon are also considered to give more value, both in terms of taste, aroma, and properties for the body, such as increasing immunity and helping to maintain blood sugar levels.

From the market side, this product is considered to have good potential, especially for consumers who are starting to switch to a healthy diet. However, for the general public, especially in areas like Kudus, consumer education is still needed so that they are more open to healthy food like this. Overall, the informants consider that these brownies are worthy of further development healthy snack.

Product Design

The following is a complete overview of product design:



Figure 2. Product Design



Figure 3. Product Manufacturing Process

Table 3. Formulation of Pumpkin Yellow Pumpkin Brownies With the Addition of Herbs

Material	Quantity (grams)
Yellow Pumpkin	200
Flour	350
Baking Powder	1/2 teaspoon
Baking Soda	1/2 teaspoon
Margarin	120
Chocolate Bars	100
Egg	3 grains
Sugar	150
Cinnamon	10
Ginger	20

Source: Processed Data, 2025

The process of making these yellow pumpkin brownies consists of three stages: mixing, molding, and baking. The first stage begins with soaking ginger and cinnamon in boiled water for two hours in a sealed container. The mixture is then brought to a boil to create the herbal addition. Next, chocolate bars are melted together with margarine, and the steamed yellow pumpkin is mashed. In a separate bowl, eggs and sugar are beaten with a mixer until fluffy. The mixture of wheat flour, baking powder, and baking soda is sifted and then combined with the mashed yellow pumpkin and egg mixture, stirring until well blended. The resulting batter is divided into two parts: the smaller portion is mixed with the remaining mashed yellow pumpkin, while the larger portion is combined with the melted chocolate and margarine. Each batter portion is then enriched with four tablespoons of the herbal addition. In the next stage, the chocolate batter is poured first into a baking tray, followed by the yellow pumpkin batter layered on top. In the final stage, the batter is baked for 45–60 minutes over medium heat until fully cooked. Once baked, the brownies are cooled at room temperature before being packaged. The product also comes with a packaging design that uses the brand name “LUNÈA”. LUNÈA is interpreted as a blend of nature and balance, which represents organic composition and uses natural ingredients, such as yellow squash, ginger, and cinnamon. In terms of packaging, the product is designed with sustainability and aesthetics in mind. The packaging uses kraft cardboard material, which is environmentally friendly and practical. On top of the lid, there is a simple yet elegant logo sticker, reinforcing the product's identity visually. The neutral and natural colors of the packaging blend in with the content of the product seen when the brownie pieces are opened with striking yellow and brown abstract patterns.



Figure 4. Product Results



Figure 5. Product Packaging Results



Figure 6. Logo Design



Figure 7. Packaging Design

Design Validation

The Validity test is in the form of an assessment through an interview involving 1 Elbina small to medium industrial entrepreneur, 2 nutritionists from Nutrition and Biology students, and 3 potential consumers.

1. Owner of Elbina Small to Medium Industrial

According to Nur Hayati, using old pumpkins more preferred because the content is more stable. Regarding additional herbs such as ginger and cinnamon, Mrs. Nur assessed that both have great potential to add functional value to the product, because in addition to adding a distinctive aroma and taste.

2. Student Nutrition

Validation was carried out by a student of Nutrition from Universitas Negeri Semarang (UNNES), Irma Hestin Pribadi. It is confirmed that margarine, sugar, and wheat flour should be replaced with healthier alternatives, such as coconut oil and stevia, to reduce glucose and saturated fat levels in products. Flours should be gluten-free, such as mocaf flour, corn flour, coconut, rice, sorghum, or oats

3. Biology Student

According to an interview with a Biology student at Universitas Islam Negeri Sunan Kudus suggested to reduce the use of chocolate bars and granulated sugar, or if possible, by replacing powdered milk. The ginger and cinnamon should be added more than before to enrich the flavor and distinctive characteristics of the product.

4. Potential Consumers

Ali suggested adding a leavening agent to improve the softness. The other two found the taste, aroma, and texture well-balanced, with a hint of spice enhancing the flavor. Eva, a sweet food enthusiast, felt the brownies were slightly less sweet, while Yanti thought the sweetness level was just right, showing that sweetness preference varies among individuals.

Product Revision

Several revisions will later be processed in the development of brownie products, including:

1. The yellow pumpkin used is ensured to come from perfectly ripe fruits with low moisture content.
2. Add ginger and cinnamon during soaking and boiling, and increase the dosage from 4 tablespoons to 6 tablespoons into the dough.
3. Some granulated sugar is replaced with stevia to reduce the glycemic index of the product.
4. The use of wheat flour is replaced with gluten-free Mocaf flour.
5. The addition of baking powder and baking soda to 1 teaspoon to improve the texture of the brownies to be more tender, but still dense according to the characteristics of the brownies.

Product Trials

Product trials were carried out directly to several existing potential consumers, including students and the general public. Based on the results of the trial, the response of potential consumers to organic yellow pumpkin brownies with a mixture of ginger and cinnamon herbal addition showed a positive response. Consumers consider these brownies to have an attractive design, as seen from the combination of brown and yellow colors. The taste, texture, and aroma are also more preferred than the early trials that still use some ingredients that are not yet fully right. The sweet taste, the taste of ginger and cinnamon spices, is more pronounced and strong than before, and the aroma that is smelled brings a heavy and natural impression. Overall, this product is considered suitable for consumption and is ready to potentially be more in the healthy market.



Figure 8. Product Trials to Potential Consumers

CONCLUSIONS AND SUGGESTIONS

This research successfully developed a healthy brownie innovation using organic yellow pumpkin combined with ginger and cinnamon. The product offers a unique taste along with nutritional and functional health benefits, such as supporting the immune system and improving metabolism. Positive responses from potential consumers and the use of local ingredients with eco-friendly packaging highlight its strong market potential. However, improvements were suggested, including replacing sugar, margarine, and wheat flour with healthier alternatives like stevia, coconut oil, and gluten-free flours such as mocaf, corn, rice, sorghum, or oats.

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