

Research Article

Purpure Sausage: Development and Sensory Evaluation

Mushaireen Bin Musa¹, Wardina Nur Sorfinaz Binti Abdul Wahid², Nur Nafisha Binti Ahjmi³, Nur Alya Nasuha Binti Azhar⁴, Dziatul Nadiah Binti Dzia-Uddin⁵, and Khazainah Binti Khalid^{6*}

¹ Universiti Teknologi MARA Cawangan Terengganu; musha268@uitm.edu.my

² Universiti Teknologi MARA Cawangan Terengganu; 2025594025@student.uitm.edu.my

³ Universiti Teknologi MARA Cawangan Terengganu; 2025512653@student.uitm.edu.my

⁴ Universiti Teknologi MARA Cawangan Terengganu; 2025982693@student.uitm.edu.my

⁵ Universiti Teknologi MARA Cawangan Terengganu; dziatul@uitm.edu.my

⁶ Universiti Teknologi MARA Cawangan Terengganu; khaza088@uitm.edu.my

* Correspondence: khaza088@uitm.edu.my; 60173900724.

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Abstract: *Purpure Sausage is an innovative snack made from nutrient-rich purple sweet potatoes and lentils, combined with minimally processed minced chicken and egg to provide a balanced protein–fiber profile and an appealing, meaty texture. Each 85 g sausage contains purple sweet potato, lentils, minced chicken, tapioca flour, egg, garlic, and seasonings. The production process includes blending the ingredients with soy protein isolate, shaping, boiling, and grilling to improve texture and flavor. A sensory evaluation involving 60 participants compared cheese and black pepper flavors prepared by boiling and steaming. The steamed cheese-flavored sausage received the highest acceptability score (6.1), demonstrating strong consumer preference and market potential.*



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1. INTRODUCTION

The modern food industry is shifting toward “plant-forward” or “hybrid” products to address growing health concerns. For example, obesity and heart disease are often linked to high consumption of traditional processed meats (Olewnik-Mikołajewska et al., 2024). While consumers continue to value the convenience of sausages, many are now seeking alternatives that are lower in saturated fat and higher in nutritional value (Fehér et al., 2020). Purpure Sausage meets this specific demand by using a blend of purple sweet potatoes and lentils, supplemented with a small amount of minced chicken and egg to ensure a familiar meaty texture and flavor that appeals to health-conscious households.

The incorporation of purple sweet potato in Purpure Sausage provides a natural, vibrant color due to anthocyanins, which are powerful antioxidants that offer significant health benefits (de et al., 2024). These natural pigments not only make the product visually distinctive but also replace the need

for synthetic dyes often found in commercial sausages. Research indicates that integrating such tubers into meat-based systems can enhance the overall antioxidant capacity of the final product, supporting the objective of creating a nutritionally enriched and naturally pigmented alternative for the target market.

Furthermore, the lentils in Purple Sausage act as a sustainable “meat extender,” increasing the product's dietary fiber and plant-protein content without compromising the structural firmness that consumers expect from a sausage (Beño et al., 2025). To ensure the product remains practical for daily use, soy protein isolate (ISP) and tapioca flour are used as binders to maintain the cylindrical shape during the boiling process, while the final grilling step is to enhance the savory aroma. By combining these functional plant ingredients with traditional seasonings like garlic and oregano, Purple Sausage offers a nutrient-dense, eco-friendly alternative to conventional snacks.

2. LITERATURE REVIEW

Purple sweet potato is highly valued in food innovation because its anthocyanin content, which can provide powerful antioxidant activity and imparts a stable natural purple color to food products (Yun et al., 2024). The starches and fiber that are in purple sweet potato have been successfully used in food processing to act as a binder and improve the texture of new products, demonstrating its role as a textural modifier in non-conventional food matrices (Lee et al., 2022).

Legumes (lentil or split pea) are key due to their strong water-holding capacity and gelling properties, which are necessary to form a stable emulsion and firm structure (Carhuanchó-Colca et al., 2024). Studies on plant-based analogues confirm that optimizing the formulation to achieve acceptable chewiness and flavor complexity results in high consumer acceptance and purchase intent, even if physicochemical properties differ from the traditional version (Mahdiyah, 2019).

3. METHODOLOGY

3.1 Materials

The Sensory Laboratory, Faculty of Hotel and Tourism Management, Universiti Teknologi MARA Cawangan Terengganu, provided all local ingredients. The ingredients and amounts needed for Purple Sausage are shown in percentage formulation in Table 1.

Table 1. Formulation of Purple Sausage.

Ingredient	Percentage (%)
Purple Sweet Potato	41.6 %
Minced Chicken	18.5 %
Tapioca Flour	13.9 %
Water	9.3 %
Cheddar Cheese	6.5 %
Black Pepper	6.5 %
Lentil	6.5%
Soy Isolated Protein (ISP)	4.6 %

Chicken Cube	1.9 %
Egg	1.9 %
Salt	1.1 %
Garlic	0.08 %

Variation (Method):

- Variation 1 - Cheese (Method Boiling)
- Variation 2 - Cheese (Method Steaming)
- Variation 3 - Black pepper (Method Boiling)
- Variation 4 - Black pepper (Method Steaming)

3.2 Methodology

Purple sausages are made by blending mashed purple sweet potato with minced chicken, tapioca flour, water, isolated soy protein, egg, salt, garlic, and chicken cube until a uniform mixture is formed, followed by the addition of either cheddar cheese or black pepper according to the formulation. The mixture is then stuffed and shaped into sausages before being cooked using either boiling or steaming methods, depending on the variation. To evaluate product quality, sensory evaluation was conducted focusing on attributes such as appearance, taste, texture, and overall acceptability, allowing comparison between cheese and black pepper formulations as well as between boiling and steaming cooking methods.

Table 2. Preparation Step of Purple Sausage.

Preparation Steps	
	Purple sweet potato is (peel) cleaned, cooked, and mashed until smooth.
	Lentils are soaked, cooked, and blended into a paste.
	Dry ingredients are mixed evenly. Mashed purple sweet potato, lentil paste, and seasonings are combined.
	The mixture is kneaded and shaped into sausage forms manually using the hand and rolled using plastic wrap. Each Purple Sausage is 85 grams.

	Divide into 4 parts: cheese flavor steaming and boiling, black pepper flavor steaming and boiling.
	The Purple Sausage will be boiled and steamed for 20 to 25 minutes.
	Once the sausages were cooled, sealed in a vacuum pack, and kept in the freezer at -18 to -20°C to preserve the shelf life.
	Final Purple Sausage product.

4. FINDINGS

4.1 Product Characteristic

A small appetizer, Purple Sausage weighs around 85 grams each. It has a soft and delicious texture that is easy to bite and chew. It is purple-golden in color. The main components are purple sweet potatoes and minced chicken combined with eggs, tapioca flour, lentils, Isolated Soy Protein (ISP), chicken cubes and garlic. The filling is grated cheddar cheese. These components create a harmony of juicy flavor and pleasant softness, which makes the bite delicious and easy to make. The compact and uniform cylindrical size also makes it easy to prepare and eat. The vacuum packaging was chosen as a product packaging. This method is also used to prevent the growth of bacteria and microbes and prolong product shelf life.



Figure 1. The vacuum packaging of Purple Sausage.

4.2 Scorecard

To assess consumer preferences, a scorecard survey was conducted over the course of one week involving university students aged 18 to 35. Sixty participants from various academic backgrounds were recruited for this sensory evaluation. To prevent bias during the tasting, the samples were labelled with random three-digit codes. After being briefed on the study's purpose, the panellists tasted the products and rated them using a scorecard ranging from 1 (strongly dislike) to 9 (strongly like). They

evaluated the products based on six specific attributes: appearance, taste, tenderness, softness, firmness, and overall acceptability.

4.3 Findings

The steamed-cheese sausage was chosen as the final product because it received the highest scores in most of the categories. Participants liked this method because the cheese gave a balanced and creamy flavor. The black pepper boiling method received the lowest rating because its mild taste was less attractive than the other flavors. Although the cheese boiling and black pepper steaming methods were enjoyable, they were not preferred by everyone for this purple sweet potato-based snack. The cheese steaming method produced a tastier and more stable sausage because the flavor was well absorbed, improving the overall taste. This finding indicates that consumers tend to prefer stronger flavors, such as cheese, making it an excellent choice for a flavorful and practical snack product.

Table 3. Mean Score of Purple Sausage.

	Appearance	Taste	Tenderness	Softness	Firmness	Overall
V1 (STEAMED : BP)	5.4	5.1	5.4	5.7	5.5	5.5
V2 (STEAMED : C)	5.7	5.7	6	6.1	5.7	6.1
V3 (BOIL : BP)	4.8	4.9	5	5.8	5	5.1
V4 (BOIL : C)	6.8	5.6	5.8	5.8	5.5	5.9

5. DISCUSSION

The development of Purple Sausage aligns with the current global shift toward “plant-forward” food production. The aim of this is to address health concerns such as obesity and cardiovascular diseases linked to high consumption of traditional processed meats (Olewnik-Mikołajewska et al., 2024). By substituting a significant portion of animal protein with a tuber-legume matrix, Purple Sausage offers a nutrient-dense alternative that is high in dietary fiber and natural antioxidants (Fehér et al., 2020). The primary ingredient is purple sweet potato, which provides more than just bulk; it also has a rich source of anthocyanins. The natural pigments offer potent antioxidant benefits and provide a vibrant, visually distinctive purple hue without the need for synthetic food dyes often found in commercial sausages (de et al., 2024).

While lentils are strategically selected as a sustainable source of meat to enhance the product's nutritional profile. Research confirms that incorporating legumes like lentils can increase the protein and fiber content of meat products while maintaining the structural firmness and “meaty” mouthfeel that consumers expect. To ensure the sausage maintains its cylindrical shape, minimal amounts of minced chicken and egg were blended with Soy Protein Isolate (ISP) and tapioca flour. These ingredients function as essential binders, improve the water-holding capacity, and ensure the product remains stable during boiling and steaming processes (Adi et al., 2025).

Sensory evaluation results highlighted a strong consumer preference for the cheese-flavored variations. While the Steamed Cheese (V2) scored highest in overall acceptability (6.1), the Boiled Cheese (V4) was significantly preferred for its appearance, receiving the highest score of 6.8. This preference suggests that the boiling process, followed by grilling, results in a more uniform heat distribution compared to steaming. This leads to the even gelatinization of sweet potato starches on the surface, creating a smoother “skin” that browns more attractively during the final cooking process (Olewnik-Mikołajewska et al., 2024).

Purple Sausage demonstrates that functional plant ingredients can successfully reduce reliance on intensive animal farming. By utilizing locally sourced sweet potatoes and lentils have a

lower carbon footprint than meat. This Purple Sausage addresses sustainability goals (Fehér et al., 2020).

6. CONCLUSION

Purple Sausage successfully proves that combining plant-based ingredients like purple sweet potatoes and lentils with a small amount of chicken can create a delicious and nutritious sausage. The sensory evaluation found that the boiled cheese flavor was the most popular among 60 participants, who praised its unique appearance and savory taste. By using natural antioxidants (anthocyanins) from potatoes and fiber from lentils, this Purple Sausage 6 reduces the need for artificial additives and heavy meat use. It shows a practical way to create “plant-forward” meals that are both healthy and sustainable.

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