

Research Article

Seitan Rendang: Assessing Suitability and Acceptance of Plant-Based Ingredients in Malay Traditional Cooking

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Abstract: *Sei-Tasty Rendang is a plant-based version of traditional Malay rendang made with seitan, a wheat-based protein that has a chewy, meat-like texture. It is developed as a healthier, more affordable, and environmentally friendly alternative to meat rendang. The seitan is seasoned and cooked with coconut milk, kerisik, chili paste, and traditional spices to create the rich flavour and dark colour of authentic rendang. Packed in a 200 g retort foil bag, it is convenient, shelf-stable, and easy to reheat. Sensory evaluation showed good consumer acceptance. With its authentic taste, affordable cost, and sustainable ingredients, Sei-Tasty Rendang has strong market potential among vegetarians, flexitarians, and health-conscious consumers.*



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1. INTRODUCTION

The growing interest in healthier and more sustainable diets has encouraged many people to explore plant-based foods (Wim Verbeke et al., 2017). Because of this trend, researchers are working to develop meat alternatives that still taste good, feel satisfying, and fit into local food cultures (Tachie et al., 2023; Mistry et al., 2020). Even though plant-based products are becoming increasingly popular, many consumers still worry about whether these alternatives can match meat in terms of flavor, texture, and overall acceptability (Szenderak et al., 2022; Zahari et al., 2025).

Seitan, a wheat-based protein, is becoming a popular choice for meat substitutes because it has a chewy, meat-like texture and absorbs flavors very well (Peng et al., 2023; Guo et al., 2020). These

features make seitan suitable for dishes that require rich seasoning and long cooking time. One such dish is rendang, a traditional Malay favorite known for its thick coconut milk, aromatic spices, and slow-cooking method that creates a deep, caramelized flavor. Rendang carries strong cultural significance in Malaysia and is often enjoyed during celebrations and family gatherings (Noor et al., 2023; Halalification, 2025).

However, traditional rendang is usually prepared with beef, making it unsuitable for vegetarians, vegans, and those who want meat-free options (Niblu, 2026). Because of this gap, the development of Seitan Rendang, including our product Sei-Tasty Rendang, aims to offer a plant-based version that still maintains the authentic flavors and richness of the original dish. Research shows that seitan can maintain its structure during cooking and hold onto strong spice flavors, making it a promising ingredient for a plant-based rendang (Guo et al., 2020; Peng et al., 2023).

By creating Sei-Tasty Rendang, this study supports the growing demand for healthier and more sustainable food choices in Malaysia. At the same time, it helps keep cultural traditions alive by offering a meat-free version of a beloved local dish. This innovation also appeals to a wide range of consumers — such as vegetarians, flexitarians, and curious omnivores — who want plant-based products that still feel familiar, flavorful, and satisfying (Szenderak et al., 2022; Zahari et al., 2025).

2. LITERATURE REVIEW

2.1 Research Rationale

In recent years, there has been a growing interest in plant-based diets due to concerns about health, sustainability, and environmental impact (Tachie et al., 2023). Traditional Malay cuisine, which is rich in spices, coconut milk, and slow-cooked methods, relies heavily on meat, making it less suitable for those seeking plant-based alternatives. Many consumers are hesitant to adopt meat substitutes because of issues with texture and taste, which are critical to the acceptance of plant-based products (Szenderak et al., 2022). Seitan, a wheat-based protein, has a meat-like texture and the ability to absorb flavours (Peng et al. 2020), making it a promising ingredient for adapting traditional dishes without compromising taste.

This research is conducted to address the gap in the acceptance of plant-based alternatives in Malaysian traditional cuisine. By developing Seitan Rendang, the study aims to provide a culturally relevant and flavorful plant-based option that could appeal to both health-conscious consumers and those interested in sustainable food choices. The study also has potential societal benefits by promoting healthier eating habits, reducing reliance on animal-based products, and supporting environmentally friendly food practices. Additionally, understanding consumer acceptance and the suitability of Seitan Rendang can guide future development and commercialization of plant-based products in Malaysia, contributing to the growth of the local plant-based food market and offering alternatives that respect traditional culinary practices while addressing contemporary dietary needs.

2.2 Current Research Status

1. Seitan – Seitan is a wheat-based protein commonly used as a meat substitute due to its fibrous texture and adaptability in cooking. Recent studies highlight seitan's potential in plant-based product development because it mimics meat texture and can be used in various dishes. Its texture allows for a satisfying eating experience. (Mistry et al., 2020).

2. Plant-based – Plant-based proteins have gained global attention due to health and environmental concerns. Research shows that plant-based products not only provide essential nutrients

but also reduce greenhouse gas emissions and resource consumption compared to conventional meat (Tachie et al., 2023).

3. Rendang – Malaysian rendang tends to be slightly sweeter and more aromatic than its Indonesian counterpart, often using toasted coconut (kerisik) to enhance flavour and texture, and it relies on rich spice paste made from herbs such as lemongrass, turmeric, and galangal, which is slow-cooked in coconut milk to create its signature aromatic and creamy flavour. The dish is slow-cooked for hours until the coconut milk reduces and the spices deeply penetrate the meat, resulting in a tender, caramelized finish.

4. Acceptance – Consumer acceptance of plant-based products depends largely on taste, texture, and familiarity. Research indicates that meat substitutes with meat-like texture and strong flavour retention achieve higher acceptance among both vegetarians and omnivores (Zahari et al., 2025)

5. Suitability – Suitability of plant-based alternatives in traditional cooking has been investigated through sensory and functional evaluation. Studies show that seitan is highly suitable for slow-cooked, spice-intensive dishes because it absorbs flavours and seasonings well, enhancing its culinary versatility effectively and maintaining texture during cooking (Guo et al., 2020).

3. METHODOLOGY

3.1 Materials

The ingredients required for preparing Seitan Rendang were readily obtainable from standard supermarkets or grocery outlets. Table 1 presents the complete list of ingredients used in the formulation of Seitan Rendang.

Table 1. List of seitan rendang ingredients

Ingredients	
<i>For Seitan</i>	<i>For Seitan Rendang</i>
Wheat flour	Cooked seitan (cubed)
Water	Coconut milk
Onion powder	Kerisik Lemongrass
Garlic powder	Turmeric leaves Kaffir
Smoke paprika	lime leaves Palm sugar
Flavoured seasoning	Dried chilli paste
Salt	Onion
Pepper	Garlic
	Ginger
	Galangal
	Salt & oil

Variations:

1. Control – non spicy, 0 gm added chillies
2. Variation 1 – spicy, 50 gm added chillies
3. Variation 2 – extra spicy, 100 gm added chillies

3.2 Sei-Tasty Rendang Preparation



The flour and water are kneaded to form gluten, which gives the dough its strength and stretchiness.



The dough is squeezed under running water to wash out the starch until the water is clear and only gluten remains.



Flavored seasoning is mixed into the gluten, and the dough is left to rest so it can absorb the flavors and settle.



The dough is gently twisted to form strands that give it a fibrous, meat-like texture suitable for rendang.



The shaped dough is wrapped and steamed for 2–3 hours, which cooks the gluten and sets its texture.



After cooking, the seitan is cooled slightly and cut into chunks or slices, like meat pieces in rendang.

Figure 1. Preparation of Seitan



Onion, garlic, ginger, galangal, and dried chili paste is blended until smooth to form the main spice base.



The blended spice paste is sautéed in oil over medium heat until fragrant and the oil begins to separate.



Lemongrass, kaffir lime leaves, turmeric leaf, salt, and palm sugar are added to enhance aroma and depth of flavor.



Coconut milk is poured in, then simmered gently over low heat for Seitan to absorb flavour.



Kerisik is added, and the mixture is cooked slowly until thickened, reduced, and oil begins to rise.



The rendang is then seasoned and cooked until almost dry. Cubed seitan is mixed until fully coated so it can absorb the flavours.

Figure 2. Preparation of Sei-Tasty Rendang

4. FINDINGS

4.1 Product Characteristics

The developed product, Sei-Tasty Rendang, is a plant-based version of Malay rendang made using seitan as the main protein. It has a firm, fibrous texture that feels like meat, and the rendang paste absorbed well into the seitan, giving it a rich aroma and authentic flavour. The product was packed in airtight, food-grade plastic containers to keep it fresh and safe. The packaging included a modern label showing the plant-based concept, nutrition information, and product identity. It was portioned for single-meal convenience, making it suitable as a ready-to-eat dish. Sei-Tasty Rendang had a dark brown colour like traditional rendang, with thick gravy coating each piece evenly. A product image was added to show the final look, texture, and packaging.



Figure 3. The packaging of Sei-Tasty Rendang product

4.2 Consumer Acceptance

A sensory evaluation involving 60 panelists was conducted to evaluate the appearance, aroma, tenderness, spiciness, and overall acceptability of the samples. The results showed that the control sample achieved the highest mean scores in most sensory attributes, indicating strong consumer preference for traditional rendang. The plant-based samples also showed acceptable sensory performance. However, their scores were slightly lower, particularly in tenderness and flavor intensity. The lower scores may be influenced by the texture differences between seitan and meat, which affect mouthfeel and flavor absorption. Therefore, the control sample was selected as the final product as it demonstrated the highest overall acceptability and met consumer expectations more effectively.

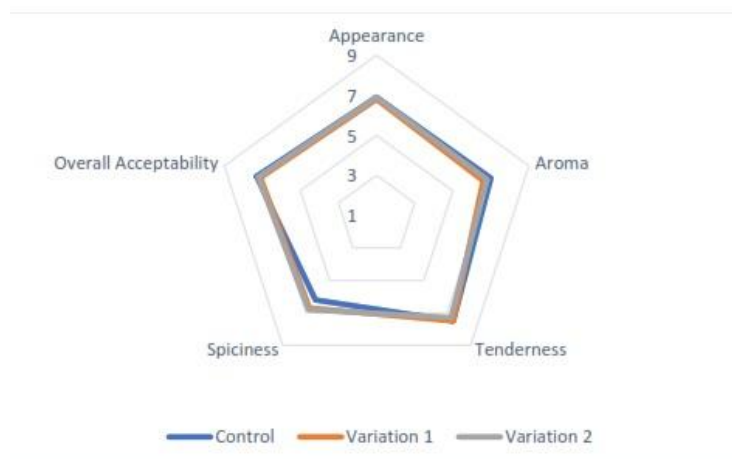


Figure 4. Acceptance level of Seitan Rendang

5. DISCUSSION

The sensory evaluation revealed that the control sample achieved the highest scores in most attributes, especially tenderness and overall acceptability, likely due to consumer familiarity with traditional meat rendang. Then it is followed by Variation 2, which was preferred over Variation 1 for aroma and tenderness, suggesting better flavour absorption and texture. Despite Variation 2's promising performance, the control was chosen as the final product for its superior sensory qualities, confirming strong consumer preference for traditional rendang.

6. CONCLUSION

Sei-Tasty Rendang was developed using proper methods and suitable plant-based ingredients to recreate the taste and texture of traditional Malay rendang. The use of seitan made the product unique, as it absorbs flavors well and delivers a meat-like bite while remaining fully plant-based. Its authentic taste, simple preparation process, and cost-effective ingredients make it suitable for wider marketing and commercialization as a ready-to-eat product.

As a sustainable alternative, Sei-Tasty Rendang supports current environmental and health trends. Further studies, such as sensory improvement, nutritional analysis, and shelf-life testing, can help refine the product and compare it with other rendang-based options in the market. With continued development, this plant-based rendang has strong potential to be adapted into other Malay dishes and introduced as an innovative local food product.

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References

- Guo, Z., Teng, F., Huang, Z., Lv, B., Lv, X., Babich, O., Yu, W., Li, C., Han, J., Wang, Y., & Jiang, L. (2020). Effects of material characteristics on the structural characteristics and flavor substances retention of meat analogs. *Food Hydrocolloids*, 105, 105752. <https://doi.org/10.1016/j.foodhyd.2020.105752>
- Halalification. (2025, September 22). *Rendang: The heart of Malaysian cuisine*. <https://halalification.com/knowledge-base/food-beverages/ethics-culture-religious-beliefs/global-muslim-food-practices-and-traditions/what-is-rendang-and-why-is-it-significant-in-malaysia/>
- Mistry, M., George, A., & Thomas, S. (2020). Alternatives to meat for halting the stable-to-table continuum—An update. *Arab Journal of Basic and Applied Sciences*, 27(1), 324–334. <https://doi.org/10.1080/25765299.2020.1819339>
- Niblu. (2026). *Rendang allergen guide*. <https://www.nib.lu/dishes/indonesian/rendang>
- Noor, M. S. A. M., Ahmad, S., & Zainudin, Z. (2023). Action research through the lens of the “rendang” analogy. *Malaysian Journal of Action Research*, 1(1), 35–44.
- Peng, Y., Zhao, D., Li, M., Wen, X., & Ni, Y. (2023). The interactions of soy protein and wheat gluten for the development of a meat-like fibrous structure. *Molecules*, 28(21), 7431. <https://doi.org/10.3390/molecules28217431>
- Szenderák, J., Fróna, D., & Rákó, M. (2022). Consumer acceptance of plant-based meat substitutes: A narrative review. *Foods*, 11(9), 1274. <https://doi.org/10.3390/foods11091274>
- Tachie, C., Nwachukwu, I. D., & Aryee, A. N. A. (2023). Trends and innovations in the formulation of plant-based foods. *Food Production, Processing and Nutrition*, 5(1), 16. <https://doi.org/10.1186/s43014-023-00149-8>

- Verbeke, W., Vermeir, I., & Brunsø, K. (2017). Healthy, sustainable and plant-based eating: Perceived (mis)match and involvement-based consumer segments as targets for future policy. *Food Policy*, 69, 46–57. <https://doi.org/10.1016/j.foodpol.2017.03.001>
- Zahari, M. S. M., Piah, Z. H. M., Fuza, Z. I. M., Abdullah, N. H., & Abidin, I. H. Z. (2025). Exploring key barriers to plant-based meat acceptance in Malaysia: Sensory, price, nutrition, and consumer perception factors. *Journal of Tourism, Hospitality and Environment Management*, 10(41), 238–252. <https://doi.org/10.35631/JTHEM.1041016>