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Vegetarian Rawon Featuring Jelly Based 'Kikil' as an Innovation in Traditional Indonesian Cuisine

Ni Luh Kartini [1]*, Iwan Surjawan[2], Dedra Naurahhuda Sholihah[3]
Culinary Arts Study Program, PIB College[1*23]
niluhkartini21@gmail.com

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Abstract
Plant based foods, particularly plant based meat analogues (PBMA), have gained increasing attention as solutions to sustainability, health, and ethical challenges within global food systems. However, most PBMA innovations remain focused on generic meat substitutes and are rarely integrated into traditional culinary contexts. This study aims to develop and evaluate a vegetarian rawon using jelly based "kikil" as a sustainable innovation in Indonesian traditional cuisine. This research employed a Research and Development (R&D) approach using the ADDIE development model and was conducted in the practice laboratory of Politeknik Internasional Bali. Data were collected through observation, literature review, and sensory evaluation using a hedonic test. A total of 30 untrained panelists participated in the sensory assessment, evaluating taste, color, aroma, texture, and innovation attributes. The results indicate that the vegetarian rawon with jelly based kikil achieved good sensory acceptance, with mean hedonic scores ranging from "liked" to "highly liked". Aroma and innovation received the highest scores, while taste and texture demonstrated acceptable performance as functional substitutes for conventional kikil. These findings suggest that plant based jelly can effectively replace gelatinous animal connective tissue in traditional dishes without compromising core sensory identity. This study contributes to the development of locally grounded PBMA by proposing a dish-based and function-driven substitution approach, while highlighting the potential of Indonesian traditional cuisine as a platform for sustainable, innovative, and market-relevant plant based food development.

Keywords: vegetarian rawon, plant based meat analogues, plant based jelly, kikil, traditional culinary innovation

Abstrak
Pangan berbasis nabati, khususnya plant based meat analogues (PBMA), semakin mendapat perhatian sebagai solusi terhadap tantangan keberlanjutan, kesehatan, dan etika dalam sistem pangan global. Namun, sebagian besar inovasi PBMA masih berfokus pada pengganti daging generik dan jarang diintegrasikan ke dalam konteks kuliner tradisional. Penelitian ini bertujuan untuk mengembangkan dan

mengevaluasi rawon vegetarian menggunakan "kikil" berbasis jelly sebagai inovasi berkelanjutan dalam kuliner tradisional Indonesia. Penelitian ini menggunakan pendekatan Research and Development (R&D) dengan model pengembangan ADDIE dan dilaksanakan di laboratorium praktik Politeknik Internasional Bali. Pengumpulan data dilakukan melalui observasi, studi literatur, dan evaluasi sensori menggunakan uji hedonik. Sebanyak 30 panelis tidak terlatih berpartisipasi dalam penilaian sensori dengan mengevaluasi atribut rasa, warna, aroma, tekstur, dan inovasi. Hasil penelitian menunjukkan bahwa rawon vegetarian dengan kikil berbasis jelly memperoleh tingkat penerimaan sensori yang baik, dengan nilai rata-rata hedonik berkisar dari "suka" hingga "sangat suka". Atribut aroma dan inovasi memperoleh skor tertinggi, sementara rasa dan tekstur menunjukkan kinerja yang dapat diterima sebagai substitusi fungsional kikil konvensional. Temuan ini menunjukkan bahwa jelly berbasis nabati dapat secara efektif menggantikan jaringan ikat hewani bertekstur gelatin dalam hidangan tradisional tanpa mengurangi identitas sensori utama. Penelitian ini berkontribusi pada pengembangan PBMA yang berakar lokal dengan mengusulkan pendekatan substitusi berbasis hidangan dan fungsi, serta menyoroti potensi kuliner tradisional Indonesia sebagai platform pengembangan pangan nabati yang berkelanjutan, inovatif, dan relevan secara pasar.

***Kata kunci**: rawon vegetarian, plant based meat analogues, jelly berbasis nabati, kikil, inovasi kuliner tradisional*

1. INTRODUCTION

In recent years, increasing public awareness of healthy lifestyles, environmental sustainability, and animal welfare has driven a substantial rise in the consumption of plant-based food products. This trend is reflected in the steady growth of the global plant-based food market, which reached approximately USD 28.6 billion in retail sales in 2024, encompassing plant-based meat, dairy alternatives, and frozen desserts (Good Food Institute, 2025). The Asia–Pacific region has experienced particularly rapid expansion, with consumption of plant-based meat and seafood substitutes increasing by up to 42% in 2021. This growth has been largely attributed to intensified product innovation and shifting consumer preferences toward more sustainable dietary patterns (Euromonitor International, 2023).

A growing body of literature indicates that consumer adoption of plant-based foods is primarily motivated by perceived health benefits, environmental concerns, and ethical considerations related to animal welfare (Perez-Cueto, 2020; Beacom et al., 2022). Among the various categories of plant-based foods, plant-based meat alternatives have gained particular prominence as substitutes for conventional meat products. These alternatives are designed to replicate the sensory characteristics of animal meat, including flavor, texture, aroma, and appearance (Sha & Xiong, 2020). Despite significant technological progress, however, achieving a convincing meat-like texture remains one of the most persistent challenges in plant-based meat development.

The complexity of meat texture arises from the hierarchical organization of muscle fibers, connective tissues, and fat, which collectively contribute to sensations such as chewiness, elasticity, and juiciness. In contrast, plant-based raw materials lack this intrinsic

fibrillar structure, often resulting in products with inferior textural properties, including brittleness and insufficient elasticity (Yuliarti et al., 2023). Consequently, the development of effective structuring and processing strategies has become a central focus of research in the field of plant-based meat alternatives.

To address these challenges, various food processing technologies have been explored. High-moisture extrusion cooking enables the formation of fibrous protein networks through controlled thermal and moisture conditions, thereby producing textures that more closely resemble those of animal muscle fibers (Widyastuti et al., 2024). Shear-based structuring further enhances the molecular alignment and elasticity of plant proteins (Tang et al., 2025). In addition, alternative approaches such as spinning, three-dimensional food printing, and protein–polysaccharide gelation systems have been investigated for their potential to regulate porosity, cohesiveness, and overall textural perception (Oliveira & Pintado, 2023; Widyastuti et al., 2024).

Within this technological framework, hydrocolloids such as agar and carrageenan have attracted increasing attention due to their ability to form elastic three-dimensional gel networks that effectively entrap water and generate a meat-like mouthfeel (Nishinari et al., 2021). Jelly-based systems, which have traditionally been associated with desserts and snack products, have recently been explored for savory applications, including their use as structural components or direct substitutes in plant-based meat formulations (Nishinari et al., 2014). Their elastic, cohesive, and moldable properties make jelly-based materials promising candidates for texture-oriented meat analogues.

Texture is widely recognized as a decisive determinant of consumer acceptance of plant-based meat products. Empirical evidence suggests that information related to health and environmental benefits exerts only a limited influence on acceptance when sensory quality, particularly texture, is perceived as inadequate (Jaeger et al., 2023). Accordingly, texture modification represents a critical aspect of jelly-based meat substitute development. This process involves the systematic manipulation of formulation and processing parameters to modify the micro- and macro-structure of the gel, with the aim of replicating the mechanical properties of meat, including hardness, springiness, and cohesiveness (Dekkers et al., 2018).

Jelly formulated from agar or carrageenan exhibits inherent elastic and chewy characteristics and can be further modified through adjustments in hydrocolloid concentration, heating conditions, cooling rates, and molding techniques (Saha & Bhattacharya, 2010). The incorporation of plant-based proteins, such as soy or pea protein, enhances protein–polysaccharide interactions, thereby improving gel strength, elasticity, and water-holding capacity (Chen et al., 2021). In addition to its structural advantages, jelly demonstrates a high capacity for flavor absorption, enabling it to effectively carry seasonings and sauces. This property is particularly important for recreating the sensory experience associated with seasoned meat products (Nishinari et al., 2021).

From a sustainability perspective, jelly-based meat substitutes also offer notable environmental advantages. Conventional livestock production requires substantial land and water resources and is a major contributor to greenhouse gas emissions (FAO, 2013). In contrast, the production of hydrocolloid-based jelly is comparatively resource-efficient and associated with a lower environmental footprint. These attributes align closely with increasing consumer demand for sustainable and innovative food products.

Despite growing interest in jelly-based systems as meat substitutes, empirical research examining their application in culturally specific dishes and their acceptance by consumers remains limited. Traditional cuisines provide valuable contexts for evaluating the feasibility of alternative ingredients, as sensory expectations are strongly shaped by cultural familiarity.

One such example is rawon, a traditional Indonesian dish typically prepared with beef and characterized by its rich seasoning and distinctive texture.

Against this background, the present study aims to evaluate the potential of jelly-based texture modification as a culturally adapted meat substitute in traditional cuisine. The specific objectives of this study are to analyze consumer acceptance of vegetarian rawon formulated with jelly-based kikil as an adapted meat substitute, to assess consumer perceptions of the product's sensory attributes and functional performance as a meat replacement, and to identify the potential of jelly-based kikil for broader application in the development of plant-based culinary menus. The findings of this study are expected to contribute to the advancement of sustainable, sensory-optimized, and culturally relevant plant-based food innovations.

2. LITERATURE REVIEW

This study exhibits distinct characteristics and clear differences compared to previous research. The study conducted by Ita Zuraida et al. (2024) aimed to examine the effects of red dragon fruit juice addition on the color, flavor, and texture of jelly candies made from *Kappaphycus alvarezii* seaweed. Their findings demonstrated that the incorporation of red dragon fruit juice enhanced both the color and flavor of the jelly and resulted in favorable panelist acceptance. The relevance of this study to the present research lies in the shared focus on evaluating sensory changes resulting from the addition of natural ingredients and the use of hedonic testing as an evaluation method. However, the study positioned jelly primarily as a confectionery product, rather than as a structural component within a broader food system.

Studies by Mulyana et al. (2014) as well as Komala Sari and Dominica (2022) demonstrated that formulation optimization through the adjustment of jelly powder concentration, citric acid content, heating temperature, and pH, significantly influenced consumer sensory preferences. These findings confirm that jelly texture is highly responsive to process conditions and compositional manipulation. Nevertheless, these studies remain largely focused on technical formulation aspects and do not explicitly link texture modification to specific culinary functions or the role of jelly within a particular dish.

Research by Nugraheni et al. (2024) and Rismandari et al. (2017) extended jelly studies toward nutritional enhancement and the substitution of animal-based gelatin. These studies highlight the potential of plant based hydrocolloids as sensorially acceptable alternatives that also meet halal requirements. Despite this, the approaches employed remain predominantly ingredient-oriented, treating jelly either as a final product or as a substitute gelling agent, rather than as a replacement for animal tissues with specific textural functions.

Consistently, the study by Nishinari et al. (2021) demonstrated that jelly textures exhibiting higher elasticity and fiber-like characteristics were preferred by consumers over overly soft or brittle textures. These findings underscore the importance of texture engineering in enhancing the acceptability of gel-based products. However, the study did not situate texture modification within a cultural context, a specific dish, or a contextual eating experience involving interactions between texture, broth, and seasoning.

A synthesis of these studies reveals several overarching patterns: (1) texture is a key determinant of consumer acceptance of jelly and gel-based products, (2) plant based hydrocolloids exhibit high flexibility for textural engineering, and (3) hedonic testing remains the dominant method for sensory evaluation. Nonetheless, a clear research gap persists, namely the absence of studies that position jelly as a functional substitute for animal tissues within the context of specific traditional dishes.

Within the *plant based meat analogues* (PBMA) literature, this gap becomes even more apparent. PBMA research consistently identifies texture as a critical challenge in plant based product development and a frequent cause of market failure, even when flavor and nutritional profiles are acceptable (Elzerman et al., 2015; Tso & Forde, 2021). Technological approaches in PBMA largely focus on simulating muscle meat through extrusion, shear cell technology, and protein structure engineering (Dekkers et al., 2018; Kyriakopoulou et al., 2019). Consequently, gelatinous animal connective tissues, such as skin or bovine tendons (kikil), remain relatively underexplored within PBMA research.

Rawon is a traditional East Javanese beef soup originating from Surabaya, Malang, and Ponorogo, with a long historical lineage. The dish is referred to as *rarawwan* in the Taji Inscription (901 AD), indicating its existence during the Ancient Mataram Kingdom. Rawon is also documented in the manuscript *Serat Wulangan Olah-Olah Warna-Warni* (1926) as a royal court dish, affirming its status as elite cuisine. Its distinctiveness lies in the use of fermented keluak (*Pangium edule*) seeds, which impart a deep black color and a characteristic earthy aroma to the broth.

The combination of spices, including shallots, candlenuts, galangal, and lemongrass, contributes to rawon's rich and complex flavor profile. Beyond its role as a daily meal, rawon functions as a cultural symbol and a core element of East Javanese identity, frequently served during traditional ceremonies, weddings, and communal celebrations, symbolizing unity and prosperity. In the modern era, rawon has gained global recognition; in 2020, TasteAtlas ranked it as the best soup in Asia.

Within the context of Indonesian traditional cuisine, rawon provides a relevant case for addressing the identified research gap. Rawon possesses a strong cultural identity, with bovine tendons (kikil) serving as the primary textural element that contributes chewiness, elasticity, and broth absorption. Culinary studies indicate that kikil contributes minimally to flavor compared to its dominant role in shaping textural experience (Fibri & Frost, 2019). These characteristics position kikil as an ideal candidate for function-based substitution rather than flavor-based replacement.

The utilization of plant based jelly as a substitute for kikil enables the preservation of rawon's distinctive sensory experience without compromising its culinary identity. This approach aligns with the paradigm of sustainable culinary innovation, in which tradition is not abandoned but adaptively transformed to address environmental challenges, health concerns, and evolving consumer preferences (Blichfeldt & Halkier, 2014; van der Weele et al., 2019). Accordingly, rawon serves not only as an object of cultural study but also as a *model dish* for context-based PBMA development.

From a theoretical perspective, this study contributes by extending the PBMA framework from a product-based imitation approach toward a function-driven and dish-based substitution model. This innovation enriches the PBMA literature by incorporating cultural and culinary function dimensions, demonstrating that plant based foods can serve as a viable strategy for innovative and sustainable preservation of traditional cuisines.

3. METHODS

This study employed a Research and Development (R&D) design as the primary methodological approach, applying the ADDIE development model (Analysis, Design, Development, Implementation, and Evaluation) as a systematic framework for product development. The ADDIE model was selected due to its structured, iterative, and evaluation-oriented nature, which is particularly suitable for food product development research. Both

qualitative and quantitative data were utilized, with data sources classified into primary and secondary data. The research was conducted in the practice laboratory of Politeknik Internasional Bali, located at Jalan Pantai Nyanyi, Beraban Village, Kediri District, Tabanan Regency, Bali, Indonesia.

During the Analysis phase, a needs assessment and preliminary study were conducted, including: (1) analysis of the textural characteristics of bovine tendons (*kikil*) traditionally used in rawon as a reference for functional texture, (2) a literature review on plant based hydrocolloid jelly and plant based meat analogues, and (3) identification of opportunities for function-based substitution of kikil focusing on chewiness, elasticity, and broth absorption capacity. This phase aimed to define the target textural specifications relevant to both culinary function and cultural context.

The Design phase focused on conceptualizing a plant based jelly kikil analogue using agar-based hydrocolloids as a functional substitute for bovine tendons. Product design included determination of the basic jelly formulation, target textural attributes (chewiness, elasticity, and cohesiveness), product shape and size, and compatibility with rawon broth application. In addition, sensory evaluation instruments in the form of a hedonic test questionnaire were developed during this phase.

The Development phase involved formulation and production of the jelly based kikil**.** The formulation process consisted of combining agar based hydrocolloids with water, with controlled adjustment of concentration, heating temperature, and gelation time to achieve a texture comparable to bovine tendons. Texture modification was carried out through controlled heating, molding, and gradual cooling to form a stable and elastic gel structure. The developed product was subsequently incorporated into rawon as a simulated culinary application.

The Implementation phase consisted of sensory evaluation testing of the jelly based kikil product within the context of rawon. A total of 30 untrained panelists participated in the study, selected using accidental sampling. Panelist inclusion criteria were: (1) aged 18 years or older, (2) prior experience consuming rawon, and (3) no known allergies to the product ingredients. Sensory acceptance was assessed using a hedonic test with a 5 point scale, evaluating color, aroma, texture, taste, and overall acceptance, following standard consumer sensory evaluation procedures.

The Evaluation phase involved analysis of both qualitative and quantitative data. Qualitative data were obtained from production observations, laboratory records, and panelist feedback. Quantitative data were derived from hedonic score ratings. Data were analyzed descriptively to determine consumer acceptance levels and to assess the suitability of the jelly based kikil texture in fulfilling the targeted culinary function. The results were presented using both formal (tables and mean values) and informal (narrative interpretation) presentation methods.

4. RESULTS AND DISCUSSION

A. Results of the ADDIE-Based Product Development

The Research and Development (R&D) process using the ADDIE model resulted in the formulation of a vegetarian rawon prototype incorporating jelly based faux kikil. During the analysis stage, preliminary observations and literature review identified kikil as a primarily textural component in rawon, contributing chewiness and elasticity rather than dominant flavor. This finding justified the selection of plain plant based jelly as a candidate substitute.

In the design and development stages, four formulation trials were conducted to optimize texture and sensory compatibility with rawon broth. Adjustments were made to the concentration of gelling agents and water ratios. Early trials produced a jelly texture that was perceived as overly firm and insufficiently cohesive. Subsequent formulations increased hydration and jelly concentration, resulting in a softer, more elastic texture and improved broth absorption. The final formulation was selected based on preliminary sensory screening, showing the closest resemblance to kikil in terms of chewiness and mouthfeel.

The implementation stage involved sensory evaluation of the finalized prototype by 30 panelists using a 5-point hedonic scale (1 = strongly dislike, 5 = strongly like). The panelists consisted of 53.3% females and 46.7% males. Most panelists were aged 20–29 years (70%), with educational backgrounds ranging from high school to undergraduate level.

B. Sensory Evaluation Results

The mean hedonic scores for each sensory attribute are presented in Table 2. Aroma and innovation obtained the highest average scores (4.5), categorized as "highly liked." Taste and texture achieved average scores of 4.1, while color received the lowest mean score (4.0), although still within the "liked" category.

For taste, 80% of panelists expressed positive acceptance (liked or highly liked). Texture acceptance was similarly high, with 83.4% of panelists indicating liking or strong liking. Aroma showed the strongest acceptance, with 100% of panelists rating it positively. All panelists perceived the product as innovative, indicating strong conceptual acceptance of the jelly based kikil substitution.

Qualitative feedback revealed that most panelists considered the product unique and suitable as a vegetarian alternative to traditional rawon. However, several panelists suggested further improvement in jelly firmness and shape to enhance resemblance to conventional kikil.

Table 1. Panelists' Overall Perception of Plain Jelly in Rawon

Panelists	Opinions
1	Not very suitable for rawon when using plain jelly.
2	A good idea for vegetarians who want to experience rawon.
3	It may need to be made thicker.
4	Plain jelly has a chewy and slippery texture, which can contrast with the tender meat-like component typically found in rawon and its rich, spiced broth.
5	It is interesting and unique.
6	In my opinion, it is quite unique because it blends well when combined with rawon broth.
7	A new innovation, though it may require some adjustments in texture or appearance so that it more closely resembles meat.
8	It is interesting and unique.
9	The aroma is similar to typical rawon, and the taste is savory and pleasant.
10	Unique.
11	Interesting.
12	In my opinion, this is a good innovation.
13	A good idea.
14	A very good innovation.
15	Plain jelly added to rawon does not alter the dish's original flavor, as the type used is plain and neutral in taste. The jelly provides a soft and chewy texture that contrasts with the tenderness of beef, creating a new sensory experience in the mouth. This innovation introduces a modern fusion element into a traditional dish such as rawon.
16	A new innovation for individuals who want to enjoy rawon but cannot consume beef.

17	Interesting.
18	A unique new menu that has potential for further development.
19	The concept and idea are very appealing.
20	Interesting to try because it can replace meat as the main ingredient.
21	Unique.
22	A good innovation.
23	Initially, I was doubtful about the taste, but it turns out to be very similar to kikil.
24	Good.
25	An exceptionally impressive idea.
26	Worth trying.
27	A very creative idea.
28	Tasty.
29	Quite interesting.
30	Adequate as a meat substitute.

(Source: Author's Research Analysis (2025)

Table 2. Average Score of Each Indicator

Indicator	**Averange Score**	**Category**
Taste	4,1	Like
Color	4,0	Like
Aroma	4,5	Highly Like
Texture	4,1	Like
Innovation	4,5	Highly Like

(Source: Author's Research Analysis (2025)

The sensory evaluation results indicate that the development of vegetarian rawon with jelly based faux kikil was generally well accepted across all evaluated attributes. Mean hedonic scores ranged from "liked" to "highly liked," suggesting that the proposed innovation successfully achieved the main research objective, namely to develop a plant based alternative that preserves the sensory characteristics and culinary identity of traditional rawon.

Aroma obtained the highest mean score (4.5; highly liked), indicating that the absence of animal-based ingredients did not compromise the aromatic quality of the dish. This finding confirms that the characteristic aroma of rawon is primarily derived from its distinctive spice composition particularly fermented keluak, garlic, coriander, and galangal rather than from bovine kikil. This result is consistent with Prescott (1999), who emphasized that complex and familiar aromas enhance consumer preference by triggering positive emotional responses and food-related memories. Moreover, this finding aligns with Yuan et al. (2022), who reported that the incorporation of spices in plant based meat analogues can effectively suppress off-flavors and enhance meat-like aroma profiles. Therefore, preserving the traditional spice system plays a critical role in maintaining sensory authenticity in plant based adaptations of traditional dishes.

The innovation attribute also achieved a very high mean score (4.5), with all panelists expressing positive acceptance. This suggests that the conceptual novelty of transforming a traditional animal-based dish into a plant based alternative was perceived favorably. This outcome supports the findings of Elzerman et al. (2019), who demonstrated that maintaining familiar dish formats while modifying specific components facilitates consumer acceptance of meat substitution strategies. In this study, vegetarian rawon with jelly based kikil was not

perceived merely as a meat replacement product but rather as a creative reinterpretation of a familiar traditional dish, thereby reducing resistance toward plant based foods.

Taste and texture both achieved mean scores of 4.1 ("liked"), indicating that ingredient substitution did not significantly diminish sensory satisfaction. Scientifically, the savory character of rawon is largely derived from its spice composition and umami-rich ingredients rather than from kikil itself. As such, replacing kikil with plant based jelly did not substantially alter the flavor profile. This finding is in line with Drewnowski (1997), who noted that umami taste and complex seasoning significantly enhance food enjoyment, even in reformulated or modified products.

Regarding texture, the acceptance of the jelly based kikil suggests that plant based hydrocolloid systems can effectively replicate the functional role of gelatinous animal connective tissues. This finding corroborates the work of Fibri and Frøst (2019), who argued that in many traditional dishes, connective tissues such as tendons primarily contribute to textural experience rather than flavor. Additionally, this result supports previous studies highlighting the versatility of hydrocolloid-based gels in mimicking the mechanical properties of animal tissues (Dekkers et al., 2018; Chen et al., 2021). Nevertheless, panelists' feedback indicating the need for further optimization of firmness reflects a common challenge in plant based meat analogue development, where texture remains a critical determinant of consumer acceptance (Moss et al., 2023).

The color attribute received the lowest mean score (4.0), although it remained within the "liked" category. This suggests that while the product's appearance was acceptable, it was not the primary driver of preference. The dark color characteristic of rawon, derived from fermented keluak, is culturally authentic but may appear visually less appealing, particularly when presented in jelly form. According to Hutchings (2003), food color perception is strongly influenced by cultural expectations and prior experiences, and deviations from expected visual norms may reduce aesthetic appeal despite favorable taste and aroma. Nonetheless, maintaining the traditional color of rawon remains important for preserving its culinary authenticity.

When viewed through the ADDIE framework, the sensory results demonstrate that the *Analysis*, *Design*, and *Development* stages successfully produced a functional and acceptable prototype. The *Implementation* stage, conducted through hedonic testing, confirmed consumer acceptance, while the *Evaluation* stage provided concrete feedback for further refinement, particularly in terms of texture optimization and visual presentation. Thus, the R&D process not only resulted in a viable product prototype but also generated actionable insights for future product development.

Overall, this study demonstrates that vegetarian rawon with jelly based kikil is both sensorially acceptable and conceptually relevant within the context of sustainable food innovation. The findings contribute to the PBMA literature by extending plant based innovation beyond muscle-meat imitation toward a function-driven and dish-based substitution approach. Furthermore, this research highlights the potential of plant based innovation as a strategy for the adaptive and sustainable preservation of traditional cuisines.

5. CONCLUSION

This study aimed to develop a vegetarian rawon by substituting bovine kikil with plant based jelly while preserving the sensory characteristics and culinary identity of traditional rawon. The results demonstrate that the developed product achieved good overall sensory acceptance, with mean hedonic scores ranging from "liked" to "highly liked." Quantitatively,

aroma and innovation received the highest mean scores (both 4.5), indicating that the use of traditional rawon spices successfully maintained aromatic authenticity while delivering a strong perception of novelty. Taste and texture obtained mean scores of 4.1 ("liked"), suggesting that the substitution of kikil with plant based jelly was sensorially acceptable and capable of approximating the functional textural role of conventional kikil. Color received the lowest mean score (4.0), although it remained within the "liked" category, indicating that visual appearance represents a parameter requiring further refinement. Overall, these findings confirm that plant based jelly can function as an effective kikil substitute in rawon, particularly in delivering chewiness and elasticity without compromising the dish's characteristic flavor. Therefore, the research objective of developing an acceptable vegetarian rawon alternative was successfully achieved. Based on the findings, future research should focus on technical improvements, including: (1) further optimization of jelly texture to enhance mechanical similarity to kikil, particularly in terms of firmness and elasticity; (2) stability testing of the jelly texture in hot broth conditions to better simulate actual consumption; (3) shelf-life evaluation to assess sensory and physical changes during storage; and (4) exploration of alternative or combined hydrocolloid systems to improve textural performance and visual appearance. This study contributes to the development of sustainable Indonesian plant based food innovations by demonstrating a function-driven and dish-based substitution approach that integrates technological innovation with the preservation of traditional culinary heritage.

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