Standardization of Eel Rendang Recipe in Tanjung Baru

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Abstract. This study aims to standardize the Eel Rendang recipe in Tanjung Baru District, Tanah Datar Regency, which includes ingredients, spices, tools, benefits, and processing methods. It also analyses shape, color, aroma, texture, and taste quality. The background of this study is the unequal and highly diverse quality of Eel Rendang produced in Tanjung Baru District due to variations in the use of basic spices, cooking methods, and doses. In addition, this sub-district is one of the regions that regularly produces Eel Rendang, has UMKM (small and medium enterprises) that consistently produce Eel Rendang, has a sufficient area for rice fields, and is one of the regions that frequently use Eel Rendang in different traditional events. This type of research is a mixed method. Five trained panelists who were knowledgeable about Rendang in terms of the concept and the processes for processing Eel Rendang served as the quantitative data sources. Qualitative data were gathered from persons who are experts at producing Rendang. The standard recipe for Eel Rendang covers the primary components, seasonings, equipment, processing methods, and quality based on the findings of this study. Based on its advantages, Eel Rendang is frequently used in customary occasions, including weddings, *batagak penghulu*, bathing celebrations, *akikah* festivities, and for daily consumption. The standard recipe for Eel Rendang passed the organoleptic test with flying colors: it was long enough, somewhat blackish brown, quite aromatic, with a dry, oily texture to the bran and flesh, as well as a pervasive spice flavor and savory bran flavor.

Keywords: Standardization, Eel Rendang, Tanjung Baru.

INTRODUCTION

Indonesia, a vast archipelago, encompasses various islands and regions, each marked by its unique ethnic diversity and cultural richness, including West Sumatra province. This province, within its diverse populace, is recognized for its rich culinary heritage, abundant in flavors from herbs and spices (Agesti et al., 2023). Among the celebrated traditional dishes from the Minangkabau region, Rendang stands out for its exceptional taste and holds a significant culinary status (Kuipers, 2017; Mardatillah, 2020).

Rendang finds its place in traditional ceremonies like weddings and communal dining occasions, like *makan bajamba* (eat on one big plate together), among other significant events. CNN hailed Rendang as the world's most delicious dish back in 2011, granting it international recognition (Rahman, 2020). The cooking process for Rendang is time-consuming, turning the dish into a brown to brownish-black hue. This extended cooking time reduces the water content in Rendang, allowing it to stay preserved at room temperature for an extended period (Ling, 2012).

Beyond West Sumatra, Rendang is often associated solely with beef. However, Rendang encompasses various types based on its ingredients (Kubo, 2010; Sari et al., 2019; Sukmawati & Salimi, 2023). Sumatra boasts a diverse array of Rendang variations, including those made from beef, *lokan* (clams), eggs, and even eels. The distinctions in the primary ingredient's characteristics in each region are influenced by the availability of livestock and natural resources in their surroundings.

Eels are the key ingredient in Rendang eel, often found in rice fields and increasingly popular in various areas. Through a survey and literature review, it has been found that Tanjung Baru District in Tanah Datar Regency is among the regions that frequently feature Eel Rendang in traditional events. Despite having UMKM (small and medium enterprises) consistently producing and distributing Eel Rendang beyond West Sumatra, along with a substantial rice field area, the lack of a standardized recipe has led to variations in aroma, taste, texture, and color in Eel Rendang across the district. This diversity raises concerns about the declining quality of Eel Rendang in Tanjung Baru District.

The authors aim to address these concerns by establishing a standardized recipe for Eel Rendang, converting ingredient measurements into grams to ensure consistency in flavor without compromising quality. Moreover, the scarcity of literature on Eel Rendang makes it essential to document this traditional dish, preserving it for future generations. Currently, the knowledge of preparing Eel Rendang is limited to a few individuals, usually the elderly. Considering the recipe variations across villages in the Tanjung Baru sub-district, the authors aspire to standardize the Eel Rendang recipe in the area. This initiative aims to equip people, especially the younger generation, with a uniform recipe, enabling them to learn, preserve, and pass down this culinary tradition to future lineages.

METHODS

The research adopted a mixed methods approach and was conducted in Tanjung Baru District, Tanah Datar Regency. The study primarily involved gathering insights from experienced mothers skilled in preparing Eel Rendang in the mentioned district. These informants possessed comprehensive knowledge regarding the ingredients, preparation techniques, and the overall quality of Eel Rendang concerning its appearance, color, aroma, texture, and taste. For data collection, a research instrument was utilized. The quantitative data obtained from this instrument can be observed in **TABLE 1**.

TABLE 1. Research instrument grid for standardizing Rendang recipes in Tanjung Baru - Tanah Datar.

Variable	Indicator	Sub-Indicator	Data Collection Techniques
Standardization of Eel Rendang Recipes in Tanjung Baru District Tanah Datar District	1. Eel Rendang recipe in Tanjung Baru District, Tanah Datar Regency	1. Materials used 2. Amount of ingredients 3. How to make 4. Traditional events that use the Eel Rendang menu	Interview Observation Documentation
	2. The process of standardizing Eel Rendang in Tanjung Baru District	1. Analyzing the Eel Rendang recipe from 6 people who are skilled in making Eel Rendang 2. Conduct a trial of the Eel Rendang recipe by providing the same amount of ingredients 3. Eel Rendang with 10 expert panelists with organoleptic tests	
	3. Quality of eel broth in terms of (shape, color, aroma, texture and taste)	1. Get the best 1 recipe out of 6 recipes that have been tested 2. The best recipe is then converted to the number of ingredients. 3. Make beef Rendang from a converted recipe 4. Conduct research on the quality of eel broth with 10 limited panelists covering (color, aroma, texture and taste)	Organoleptic test questionnaire

The study employed observation, interviews, and documentation as methods for data collection. Qualitative data analysis encompasses three main activities: a. data reduction, b. data presentation, and c. conclusion verification. The techniques for data analysis are illustrated in the following **FIGURE 1**.
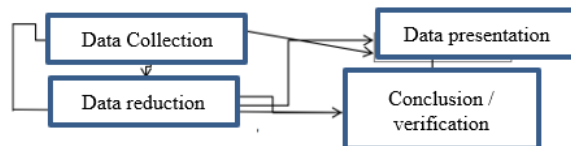

FIGURE 1. Components of data analysis.

Accurate data were ensured by validating it through the methodology articulated by Moleong (2012), which involved the following steps: 1. Extended Involvement, 2. Continuous Observation, 3. Rendang Triangulation.

RESULTS AND DISCUSSION

Results

The standardization process for the Eel Rendang recipe in Nagari Tanjung Alam involved qualitative methods such as observation, interviews, and documentation. Initial observations focused on gathering regional data, understanding the leadership structure, and collecting information from informants. Subsequent interviews with informants revealed insights into the significance, preparation, recipe, and quality of Eel Rendang in Nagari Tanjung Alam. The collected data were further reinforced with visual documentation, including photos and videos taken during these observations and interviews.

From interviews conducted with ten informants, it was concluded that Eel Rendang is a traditional Minangkabau dish prepared using eel, coconut milk, special herbs, and spices, often served at various cultural ceremonies and for daily consumption. The primary ingredients derived from the interviews include eel, coconut milk, and a mix of spices and herbs such as red chilies, shallots, garlic, ginger, galangal, bay leaves, turmeric leaves, lime leaves, and lemongrass stalks. Additionally, assessments of the Eel Rendang's quality based on informant interviews and observations indicated its extended shelf life, a somewhat blackish-brown color, a pleasant aroma, a dry yet oily texture, tender meat, and a robust and savory flavor profile. **TABLE 2** to **4** showcases the three most preferable Eel Rendang recipes from the Tanjung Baru District.

TABLE 2. Kartini's Eel Rendang Recipe in Jorong Bulaan, Nagari Tanjung Alam, Tanjung Baru District.

Material		How to make
Wet Eel	1 kg	Prepare tools and materials. Clean the eel from its dirt, then wash the eel clean. Once clean, roast the whole eel over hot coals until 12 cooked, then remove and cut into pieces 5–6 cm in size. Finely chop all the leaves, then wash and set aside. Finely grind all the spices. Prepare a large frying pan, then add coconut milk, roasted coconut, and spices that have been mashed earlier, and cook until the oil appears. After the oil appears, add the finely chopped leaves, then stir until well blended. After the coconut milk has turned into *kalio* and the leaves have laid down, add the eel that has been cut—cut earlier—then stir and cook until cooked and the color of the Rendang becomes blackish brown. Remove from the fire.
Coconut	4 items	
Ground Chili	¼ kg	
Garlic	1 pcs	
Red onion	1 handful	
Ginger to taste	adequately	
Galangal	adequately	
Lime leaves	adequately	
Turmeric leaves	2 sheets	
Lemongrass	2 pcs	
Salt	adequately	
Turmeric	adequately	
Surian leaves	adequately	
Welcome leaves	adequately	
Palm leaves	adequately	

Material		
Bay leaf	adequately	
Sour *kesambi* leaves	adequately	
Banana leaves	adequately	

TABLE 3. Maya's Eel Rendang recipe in Jorong Ampaleh Nagari Tanjung Alam.

Material		How to make
Wet Eel	1 kg	Prepare tools and materials. Clean the eel; after cleaning, cut the eel into pieces 5–6 cm in size, and then fry in hot oil until 12 dries. Finely chop all the leaves, then wash and set aside. Prepare a large frying pan, then add the coconut milk and spices that have been mashed earlier and cook until the oil appears. After the oil has risen, add the finely chopped leaves, stir until the coconut milk shrinks a little, then add the fried eel, cook until cooked, and then remove from the fire.
Coconut	4 items	
Ground Chili	¼ kg	
Garlic	1 pcs	
Red onion	1 ½ oz	
Ginger	1 knuckle	
Galangal	enough	
Lime leaves	adequately	
Turmeric leaves	2 sheets	
Lemongrass	1 stick	
Salt	adequately	
Turmeric	1 knuckle	
Candlenut	adequately	
Surian leaves	adequately	
Sambal leaves	adequately	
Palm leaves	adequately	
Bay leaf	adequately	

TABLE 4. Tina's Eel Rendang recipe in Jorong Kapuak, Koto Panjang Ponco, Nagari Barulak, Tanjung Baru District.

Material		How to make
Crushed wet eel	1 kg	Prepare tools and materials. Clean the eel that is already crushed, then wash the eel clean. Once clean, cut the eel into pieces ± 5-6 cm in size and then fry in hot oil until dry. Finely chop all the leaves, then wash and set aside. Prepare a large frying pan, add the coconut milk and spices mashed earlier, and cook until the oil appears. After the oil has risen, add the finely chopped leaves, stir until the coconut milk has shrunk a little, add the fried eel, cook until cooked and blackish brown, then remove from the fire.
Coconut	5 grains	
Ground Chili	3 oz	
Garlic	1 pc for large	
Red onion	1 ½ oz	
Ginger	adequately	
Galangal	1 knuckle	
Lime leaves	adequately	
Turmeric leaves	adequately	
Lemongrass	2 sticks	
Salt	adequately	
Turmeric	1 knuckle	
Banana leaves	adequately	
Surian leaves	adequately	
Sambal leaves	adequately	
Palm leaves	adequately	
Bay leaf	adequately	

The process of standardizing the Eel Rendang recipe involves key components such as primary ingredients, seasonings, additional leaf-based elements, adjusted ingredient proportions, tools utilized in preparation, processing methodologies, and the quality benchmarks for the resulting Eel Rendang. This standardization endeavor commenced with an initial sensory evaluation conducted on six distinct Rendang recipes from various villages, engaging ten skilled Rendang artisans in the Tanjung Baru District. These individuals represented Nagari Tanjung Alam and Nagari Barulak, each comprising three experts. Following the sensory tests performed on the six Rendang recipes from each Nagari, three Rendang recipes were shortlisted based on achieving the highest average scores. The Eel Rendang recipe recording the highest average score will be adopted as the standard recipe, inclusive of the adjusted ingredient quantities. Each Rendang recipe underwent scoring based on five fundamental quality dimensions: shape, color, aroma, texture, and taste. The evaluation scores for all six recipes are detailed in **FIGURE 2**.
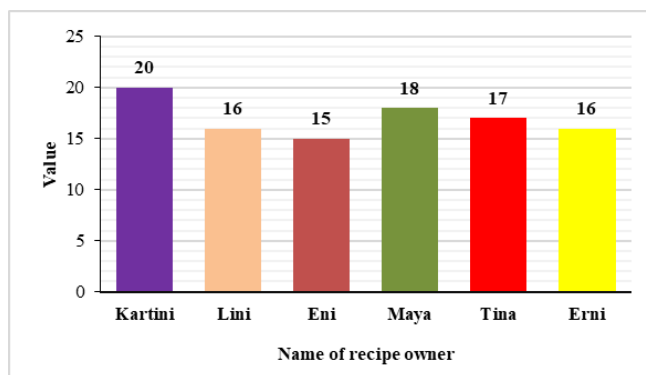

FIGURE 2. Average organoleptic test results for six Eel Rendang in Tanjung Baru District.

Following the sensory evaluations of six Eel Rendang recipes from each village, three Rendang recipes emerged as candidates for the most optimal Eel Rendang recipe, based on achieving the highest average value. These recipes underwent detailed evaluation across five quality dimensions: shape, color, aroma, texture, and taste. **FIGURE 3** are the assessment scores for the three selected Rendang recipes.
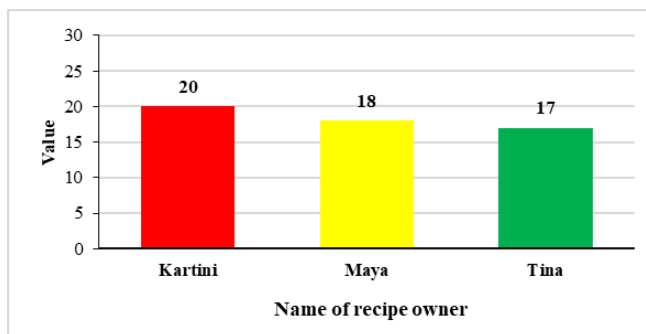

FIGURE 3. Average organoleptic test results for 3 recipes for eel stew in Tanjung Baru District.

Based on the data above, it can be seen that the highest score obtained from the three Eel Rendang recipes is the recipe belonging to Mrs. Kartini from Jorong Bulaan, with an average value of 20.

Table 5. Kartini's Eel Rendang recipe.

Material		How to make
Wet Eel	1 kg	Prepare tools and materials. Clean the eel from its dirt, then wash the eel clean. Once clean,
Coconut	4 items	roast the whole eel over hot coals until 12 cooked, then remove and cut into pieces 5–6 cm in
Ground Chili	¼ kg	size. Finely chop all the leaves, then wash and set aside. Finely grind all the spices. Prepare a
Garlic	1 pc sdg	large frying pan, then add coconut milk, roasted coconut, and spices that have been mashed
Red onion	1 handful	earlier, and cook until the oil appears. After the oil appears, add the finely chopped leaves, then

Material		How to make
Ginger to taste	adequately	stir until well blended. After the coconut milk has turned into kalio and the leaves have laid down, add the eel that has been cut—cut earlier—then stir and cook until cooked and the color of the Rendang becomes blackish brown. Remove from the fire.
Galangal	adequately	
Lime leaves	adequately	
Turmeric leaves	2 sheets	
Lemongrass	2 pcs	
Salt	adequately	
Turmeric	adequately	
Surian leaves	adequately	
Welcome leaves	adequately	
Palm leaves	adequately	
Bay leaf	adequately	
Sour kesambi leaves	adequately	
Banana leaves	adequately	

TABLE 6. Kartini's Eel Rendang recipe has been converted.

Material		How to make
Wet Eel	kg	Prepare tools and materials. Clean the eel from its dirt, then wash the eel. Once clean, roast the whole eel over hot coals until cooked, then remove and cut into pieces 5–6 cm in size. Finely chop all the leaves, then wash and set aside. Finely grind all the spices. Prepare a large frying pan, then add coconut milk, roasted coconut, and spices that have been mashed earlier, and cook until the oil appears. After the oil appears, add the finely chopped leaves, then stir until well blended. After the coconut milk has turned into kalio and the leaves have withered, add the eel that has been cut—cut earlier—then stir and cook until cooked and the color of the Rendang becomes blackish brown. Remove it from the fire.
Thick coconut milk	1600 ml	
Watery coconut milk	2400 ml	
Ground Chili	¼ kg	
Garlic	80 gr	
Red onion	150 gr	
Ginger	50 gr	
Galangal	50 gr	
Lime leaves	2 gr (±5 sheets)	
Turmeric leaves	5 gr (±2 sheets)	
Lemongrass	30 gr (2 sticks)	
Salt	10 gr	
Turmeric	5 gr	
Surian leaves	50 gr	
Welcome leaves	50 gr	
Palm leaves	100 gr	
Bay leaf	1 gram (±3 sheets)	
Sour kesambi leaves	50 gr	
Banana leaves	30 g	

The quality assessment of Eel Rendang was conducted in two separate studies, both employing indicators such as shape, color, aroma, texture, and taste. Consistent materials and processing methods were utilized in both studies, resulting in an identical quality profile for Rendang. Details outlining the resultant data are depicted in **FIGURE 4**.
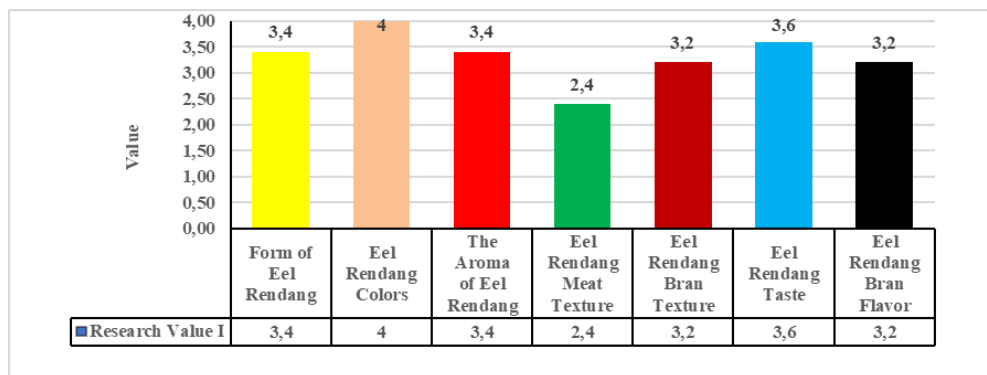
FIGURE 4. The average quality of Eel Rendang in Tanjung Baru District (Research I).

The table exhibits the shape evaluation of the Eel Rendang, specifically its length, and the corresponding average quality score. From the data, it's evident that three panelists rated it as 4, defining it as "lengthy". Another panelist rated it as 3, indicating it's "long enough". There was one panelist who rated it as 2, suggesting it's "not sufficiently long". The overall assessment for the shape of the Eel Rendang obtained an average score of 3.4.

The table provides insights into the assessment of Rendang color, specifically its dark brown shade, along with the average quality score. According to the data, five panelists gave it a score of 4, denoting "dark brown". The evaluation of the Eel Rendang's color averaged a score of 4.

The table presents the assessment of the aroma of Eel Rendang, specifically its fragrance from the leaves utilized, along with the average quality score. The data indicates that two panelists rated it as a 4, indicating a good smell, while three panelists rated it as a 3, indicating a good enough aroma. The overall assessment of the aroma of the Eel Rendang averaged at 3.4.

The table illustrates the assessment of the texture quality of Eel Rendang meat, focusing on its softness. According to the data, one panelist rated it as 4, signifying softness; 1 panelist rated it as 2, suggesting it was not soft; and another panelist rated it as 1, indicating it was not soft. The overall assessment of the Eel Rendang meat's texture averaged at 2.4.

The table showcases the assessment of the texture quality of Eel Rendang bran, focusing on its dryness and oily feel. From the data, three panelists rated it as 4, signifying it was dry and had an oily feel; 1 panelist rated it as 3, suggesting it was moderately dry and oily; and one panelist rated it as 1, indicating it was neither dry nor oily. The overall assessment of the Eel Rendang bran's texture averaged at 3.2.

The evaluation of the taste of Eel Rendang seasoning showed that three panelists rated it as 4, indicating it was strongly pervasive, while two panelists scored it as 3, suggesting it was moderately pervasive.

The evaluation of the taste of Eel Rendang bran indicated that three panelists rated it as 4, denoting it as delicious, while one panelist rated it as 3, indicating it was quite tasty. Additionally, one panelist rated it as 1, suggesting it was not flavorful. The average score for the taste of the Eel Rendang bran was 3.2.
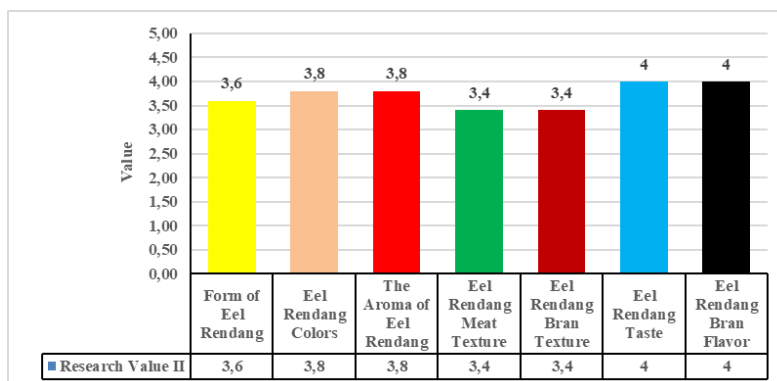

FIGURE 5. The average quality of Eel Rendang in Tanjung Baru District (Research II).

The table above displays the evaluation of the eel cage's shape, particularly its length, along with the average assessment provided by panelists. The data suggests that three panelists rated it as length-appropriate with a score of 4, while two panelists rated it as sufficiently long with a score of 3. This resulted in an average assessment of 3.6 for the eel cage's shape.

Rendang color, particularly its darkness (dark brown), and the average assessment based on research results are presented in the table above. The data indicates that four panelists rated it as a dark brown with a score of 4, while one panelist rated it as sufficiently dark brown with a score of 3. The average assessment of the Eel Rendang's color was 3.8.

The aroma of Eel Rendang, specifically the fragrance derived from the used leaves, is presented along with the average assessment based on the research results, as depicted in the table above. The data indicates that four panelists rated the aroma as a score of 4, signifying that it has a good fragrance, while one panelist rated it as good enough, providing a score of 3. The overall assessment of the bran and eel meat aroma averaged at 3.8.

The texture evaluation of Eel Rendang Meat, focusing on its softness, and the average assessment based on the research results are displayed in the table above. The data reveals that three panelists rated the texture as a score of 4, signifying that it was soft, while one panelist rated it as quite soft, providing a score of 3. Additionally, one panelist stated that it wasn't sufficiently soft, giving a score of 2. The overall assessment of the beef Rendang texture averaged at 3.4.

The evaluation of Eel Rendang Bran texture, focusing on its dryness and oily feel, along with the average assessment, is depicted in the table above. According to the data, three panelists rated the texture as 4, signifying that it was dry yet greasy. Additionally, one panelist rated it as quite dry and moderately oily, providing a score of 3. Another panelist mentioned it was less dry and less greasy, giving a score of 2. The overall assessment of the eel's Bran Rendang texture averaged at 3.4.

The average rating for the quality of Eel Rendang seasoning flavor, represented in the table, indicates a unanimous agreement among the five panelists who scored it at 4, suggesting that the seasoning had a pervasive taste. Overall, the evaluation of the Eel Rendang seasoning flavor averaged at 4.

The average score for the quality of Eel Rendang Bran, as depicted in the table, suggests a unanimous agreement among the five panelists who rated it at 4, signifying that the Eel Rendang bran was deemed tasty. The overall assessment of the taste of the Eel Rendang bran averaged at 4.

Discussion

The Eel Rendang recipe derived from qualitative research methods such as observation, interviews, and documentation in Nagari Tanjung Alam Batusangkar encompasses essential components. This includes the primary ingredients, spices, and herbs utilized, as well as the adjusted ingredient sizes, tools required for processing, the method of preparation, and the resulting quality. The recipe employed in this study represents a consensus from two Nagari within the Tanjung Baru and Tanah Datar Districts, reflecting similar spice combinations and preparation techniques found across various villages.

From the six tested Eel Rendang recipes, namely those from Kartini, Maya, and Erni from Nagari Tanjung Alam, and Lini, Eni, and Tina from Nagari Barulak, three recipes stood out with the highest scores. Further scrutiny led to the identification of one recipe that obtained the highest overall score. Notably, Kartini's Eel Rendang recipe from Nagari Tanjung Emas secured the top spot with a score of 20 in the organoleptic test. This indicates a preference for Kartini's rendition of Eel Rendang among the people in Nagari Tanjung Alam Batusangkar. As a result, Kartini's Eel Rendang recipe will be adopted as the standardized recipe with adjusted ingredient sizes for this study.

The shape of food plays a vital role in its presentation, characterized by forming and cutting ingredients in a tidy and consistent manner (Xiao et al., 2016). As per the research findings, the Eel Rendang showcases a quality shape, measuring approximately 5–6 cm in length. However, variations in the cutting and processing methods contribute to slight irregularities in the Eel Rendang's shape.

The color combination in food significantly impacts consumer appeal, requiring a balance that avoids dull or mismatched appearances among ingredients. Rendang's anticipated color quality is a blackish brown, attributed to caramelization and prolonged cooking (Raji et al., 2017). Research findings indicate that both the eel and the bran Rendang display a blackish brown hue. This color is achieved through an extensive cooking process, resulting in the eel and bran Rendang adopting the desired blackish brown shade.

Aroma plays a crucial role in shaping consumers' perceptions of food. Rendang varieties exhibit distinct aromas and flavors derived from diverse ingredients, herbs, and spices. The characteristic scent and taste of Rendang stem from the meat, coconut milk, and spices used in its preparation (Gusnita & Mariana, 2020). Research findings reveal that the aroma of Eel Rendang originates from the amalgamation of coconut milk, spices, and a variety of leaves involved in the cooking process.

Texture refers to a material's feel or consistency discernible through touch or taste. Eel Rendang is anticipated to possess a soft texture, resulting from extensive cooking, lean meat, and the oily characteristic of dry bran Rendang (Von, 2012). Findings from the research indicate that the Eel Rendang exhibits a moderately soft texture, while the bran Rendang's texture is somewhat dry yet oily. Extended cooking in coconut milk renders the eel's texture quite soft, while the prolonged cooking process of coconut milk and spices leads to the oiliness observed in dry bran Rendang.

Taste is a crucial aspect, with the tongue's taste receptors capable of detecting fundamental tastes like sweet, sour, salty, and bitter. When combined in certain foods, these tastes create a distinctive and delightful flavor. Rendang is expected to have a savory taste, resulting from the amalgamation of ingredients and Rendang spices during the cooking process (Aliah & Elida, 2022). According to the study findings, the taste of Eel Rendang indeed aligns with expectations and is identified as savory. This savory taste emerges from the harmonious blend of spicy, sweet, and salty elements derived from the ingredients and spices utilized in its preparation (Patterson & Aftel, 2017).

CONCLUSION

Based on the research results obtained from observations, interviews, documentation, organoleptic test questionnaires, and the discussion that has been described, it can be concluded that:

- Standardizing a recipe involves creating a benchmark that's been thoroughly assessed and serves as a guideline for preparing a dish. It encompasses details about ingredients, tools, and techniques to ensure consistent quality and facilitate cost control. In the context of qualitative research involving observation, interviews, and documentation within Tanjung Baru District, Tanah Datar Regency, researchers selected Kartini's Eel Rendang recipe from Nagari Tanjung Alam as the standard recipe. This particular recipe outperformed others in the organoleptic tests conducted among skilled Rendang makers, earning favor among the locals of Tanjung Baru District for its authentic representation of the area's typical beef Rendang taste.

- The quality assessment of Eel Rendang unveils several facets. Firstly, in terms of shape, the eel slices, initially cut at 6 cm, undergo changes due to extended roasting and cooking, resulting in a fairly satisfactory shape post-cooking. The color, a blackish brown, stems from a prolonged cooking technique using small coal fires known as the Sungai-sangria method, amalgamating ingredients and seasonings for an extended duration. This process imparts the distinctive blackish brown hue to the Rendang. The aroma is characterized by fragrances from coconut milk, spices, and the leaves used, created through the extended simmering of this blend, offering a recognizable Rendang aroma. Texture-wise, the eel undergoes an initial burning process followed by prolonged cooking in coconut milk, rendering a relatively soft texture. Additionally, the bran in Eel Rendang, cooked extensively with coconut milk, spices, and leaves, tends to dry and release oil, resulting in a dry yet oily texture. Finally, the savory taste, resulting from a harmonious blend of spices and ingredients, delivers a well-balanced combination of spicy, sweet, and salty flavors, culminating in the distinctive savory taste.

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