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Ranking of masak lemak cili padi cuisine: A Delphi study

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Abstract

The *masak lemak cili padi* dish is closely associated with Negeri Sembilan. Migrants from Padang, Indonesia, known as the Minangkabau, introduced their cultural heritage to this Malaysian state through their traditional cuisine. The *masak lemak cili padi* dishes are renowned in Negeri Sembilan, attracting tourists and customers from various ethnic backgrounds. This study aims to apply the Delphi method, a structured communication technique that involves a panel of experts, to rank the nine types of *masak lemak cili padi* dishes at Restaurant X, the biggest restaurant in Negeri Sembilan that specialises in this cuisine. The Delphi method is chosen for its ability to reach consensus among a group of experts, in this case, 30 participating customers. Based on Kendall's coefficient of concordance $W=0.351$ and $p<0.001$, the nine dishes' ranking was deemed consistent. The study revealed that *masak lemak cili padi* using smoked beef, chicken, smoked duck, and crab were the most popular choices for the 30 participating customers. The least popular are *gulai pucuk*, smoked catfish, *telur itik*, fish/prawn and *siput sedut*. Restaurant X is recommended to focus more on the traditional *masak lemak cili padi* dishes, particularly smoked beef, chicken, and duck. The usage of customers instead of subject matter experts, coupled with the robustness in conducting the Delphi study to scientifically rank the *masak lemak cili padi* dishes, are the major contribution of this study.

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1. Introduction

Being a multiracial country, Malaysia is well-positioned as a food paradise. The cultural heritage varies from north to south. However, there are various similarities and differences between these two. Malay heritage food is influenced by many cultures, such as Arab, Indian, Chinese, Siamese, Javanese, and Minangkabau. All cooking techniques and ingredients used in Malay cuisine have a unique aroma, taste, and flavour based on the settlement area and the assimilation process that originated from the influence of colonialism. It also includes *masak lemak cili padi*, an iconic dish that represents the traditional Malay cuisine of Negeri Sembilan. It is a traditional Minangkabau cuisine cooked with fish, sea snails, chicken, ducks, vegetables, and smoked meat.

Malaysia's culinary heritage reflects its multicultural society, where Malay, Chinese, Indian, and other ethnic traditions converge to create a rich tapestry of flavours (1). Each state

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contributes distinct food preparations, often influenced by geographical proximity and historical interactions with cultures such as the Javanese and Bugis, as seen in the traditional *masak lemak cili padi* dish from Negeri Sembilan (2). Similar findings are related to a study of the Indonesian *nasi goreng*, highlighting the essence of the nation's culinary heritage (3).

Masak lemak cili padi are tongue-tingled dishes. Its literal translation is cooked in “*santan* and chilli,” perfectly capturing the essence of this meal. It is prepared from a combination of *santan* or coconut milk, turmeric, and bird’s eye chilli, also known as *cili padi* in Malay. These ingredients yield a rich, spicy, and somewhat sweet flavour that is distinctively Malaysian, particularly in the Negeri Sembilan. This meal is typically made of meat, prawns, chicken, fish, and crabs and is best served with white rice. The general belief is that it tastes better if the main dish is smoked meat, ducks, or fish (4).

This study contributes to the theory of heritagisation by focusing on heritage in food studies in the context of *masak lemak cili padi* (5). In addition, the authenticity of heritage foods is determined by the legacy, people, and places. Heritage-focused research can be divided into two opposing perspectives. This study seeks to identify legitimate heritage claims concerning *masak lemak cili padi* as per studies conducted on coffee (6), *rendang* (7), and pizza (8). The people of Negeri Sembilan originate from Minangkabau *perantau* (emigrants) from West Sumatra. The term *merantau* (migrate) in this study is related to the Minangkabau tradition of leaving their homeland to seek fortune in a new location, which established a framework for the inter-island migration from Sumatra to the Minangkabau migrant traders in Malaysia (9). This tradition has significantly impacted the history, family ties, and cultural heritage of the Sumatra, Negeri Sembilan, and the Minangkabau diaspora. Migration further played a crucial role in introducing Minangkabau cuisine to Malaysia (10). The migrating community brought over the unique flavours and cooking techniques that characterize Minangkabau cuisine and contributed to the rich tapestry of Malaysian culinary heritage. As the Minangkabau community settled in Malaysia, they integrated their traditional recipes and culinary practices with local Malaysian ingredients and cooking styles, creating a fusion that is now deeply embedded in the fabric of Malaysian cuisine. The influence of Minangkabau cuisine can be seen in popular Malaysian dishes such as *rendang*, *nasi padang*, *sate padang*, and *masak lemak cili padi* (11), which have become beloved staples in the country’s culinary landscape. In a previous study, a list of local delicacies and eateries was compiled, featuring a list of popular dishes and must-try delicacies from each state in Malaysian (12) (Table 1). Among these, *masak lemak cili padi* were identified as one of the most popular foods visitors must try in the Negeri Sembilan.

To understand what makes different versions of *masak lemak cili padi* popular, it is important to examine how certain traits affect their overall acceptance. The intensity of the aroma is crucial in traditional spice-rich dishes. The combination of toasted spices, fresh herbs, and coconut milk creates an aroma that reflects authenticity and quality. Studies on coconut milk-based sauces have shown that changing the concentration of coconut milk can significantly affect the flavour and aroma intensity (13). The rich aroma, enhanced by roasted spices and light caramelization during cooking, hints at the upcoming flavour complexity.

The spiciness of the dish mainly comes from the use of chilli padi. The heat level, which is determined by the type and freshness of the chilli, is essential. *Masak lemak cili padi* features a perfect balance of spiciness that adds a necessary kick, complementing the creaminess of coconut milk for a rich flavour experience. Creaminess from the coconut milk base is crucial to consumer satisfaction. The smooth, rich consistency affects the dish's look

and feel, enhancing mouthfeel and adding depth to the flavour. Variations that create a well-emulsified sauce with the right fat content often make the dish more appealing, as the creaminess can balance the spice intensity (13).

Table 1. A compilation of local delicacies and eateries in Malaysia.

Regions	Local delicacies
Kuala Lumpur	N/A
Selangor	<i>Sate</i> , tapioca and banana chips; Indian food; seafood
Putrajaya	N/A
Negeri Sembilan	<i>Masak lemak cili padi</i> , <i>apam</i> Johol, <i>lemang</i> , <i>sate tulang</i> Jelebu, <i>nasi ulam</i> , <i>air jando pulang</i> , seafood
Malacca	<i>Sate celup</i> , <i>cencaluk</i> , <i>gula melaka</i> , chicken rice ball, seafood, Nyonya food, Chitty food, Portuguese food
Johor	<i>Johor laksa</i> , <i>nasi briyani gam</i> , <i>mee bandung</i> , <i>lontong</i> , seafood
Perak	<i>Ikan pekasam</i> , <i>nasi kandar vanggey</i> , <i>rendang tok</i> , chicken rice with bean sprouts, seafood, pomelo, Ipoh white coffee
Penang	<i>Char kway teow</i> , <i>assam laksa</i> , <i>nasi kandar</i> , <i>Hokkien mee</i> , <i>pasembor</i> , <i>rojak</i>
Kedah	<i>Kuala Kedah laksa</i> , <i>pekasam</i> , <i>nasi ulam</i> , seafood
Perlis	<i>Perlis laksa</i> , grilled catfish, Kuala Perlis grilled seafood
Pahang	<i>Lemang periuk nera</i> , <i>mee calong</i> , <i>Pahang laksa</i> , <i>opor Pahang</i> , <i>puding raja</i>
Terengganu	<i>Laksam</i> , <i>nasi dagang</i> , <i>satar</i> , <i>keropok lekor</i> , <i>otak-otak</i> , <i>nekbai</i> , <i>Terengganu laksa</i> , <i>ketupat sotong</i>
Sabah	<i>Tuaran mee</i> , <i>ambuyat</i> , <i>hinava</i> , <i>tuhau</i> , <i>kelupis</i>
Sarawak	<i>Sarawak laksa</i> , <i>mee kolok</i> , <i>bubur pedas</i> , <i>manok pansuh</i> , <i>ikan terubok masin</i> , Sarawak layer cake, bird's nest soup, Sarawak pepper, Sarikei pineapple
Labuan	<i>Lamban</i> , <i>punjung</i> , <i>jelurut</i> , coconut pudding

Source: Mohd Sanip MNA, et al. (12)

The protein texture of meat or seafood adds to the differences in *masak lemak cili padi* preparations. The tenderness and juiciness of the protein enhance the mouthfeel and flavour experience while chewing. A protein that is too tough or fibrous might not soak up the rich, spicy sauce properly. A tender, well-cooked protein pairs nicely with the creamy and aromatic elements of the dish. While there are few direct studies on *masak lemak cili padi*, similar sensory profiling in coconut milk-based and spice-infused dishes such as *rendang* indicates that textural attributes significantly enhance consumer enjoyment (14).

A strong aroma, spiciness, a nice creaminess, and an appealing protein texture explain why some *masak lemak cili padi* variations are more favoured. Sensory attributes combine to create a rich and enjoyable culinary experience that appeals to traditional tastes and modern preferences.

Due to its popularity, many restaurants offer *masak lemak cili padi* dishes, the biggest being Restaurant X in Pedas, a district in the Negeri Sembilan. Restaurant X is approximately two kilometres from the north-south highway's Pedas exit, roughly 20 km south of the Seremban exit. Restaurant X is one of the must-visit spots in Rembau because of its unique set-up compared to typical Malay roadside eateries. With a zinc roof, electric fans, tables and chairs, and no walls or air conditioning, Restaurant X offers distinct comfort to customers within a traditional setting. In addition, it serves an excellent variety of Negeri Sembilan-style *masak lemak cili padi* using smoked meat or beef, smoked chicken, and smoked duck (Figure 1).



Figure 1. Smoked meat or beef *masak lemak cili padi*.

Another popular dish at the restaurant is smoked chicken or smoked duck *masak lemak cili padi*. Restaurant X is famous among the various ethnic groups. Consumers who do not eat smoked meat can choose smoked chicken or duck meat. The unique smoky flavour of the chicken or duck complements the rich and creamy *lemak cili padi* sauce, making it a favourite among locals and visitors alike. The popularity of smoked chicken or duck *masak lemak cili padi* at Restaurant X further enhances its reputation as a must-visit spot in Negeri Sembilan for those seeking authentic and flavourful traditional cuisine. Besides that, Restaurant X also serves seafood such as crabs, lobsters, snails, and a variety of fish cooked as *masak lemak cili padi*.

Restaurant X has successfully captured the taste buds of a diverse clientele with its renowned *masak lemak cili padi*. Incorporating smoked dishes into the traditional Malaysian *masak lemak cili padi* adds a distinctive flavour profile that resonates well with patrons. Restaurant's popularity among various ethnic groups underscores its ability to cater to a broad spectrum of tastes (15). What defines Restaurant X as its inclusivity is that even those who do not generally consume smoked meals or *masak lemak cili padi* can enjoy other tasty dishes. This adaptability not only showcases the culinary expertise of the restaurant but also contributes to its widespread appeal. In a culinary landscape celebrating diversity, Restaurant X stands out as a destination in which different cultural preferences converge harmoniously. The success of the diverse smoked *masak lemak cili padi* dishes at Restaurant X is a testament to its ability to innovate and create dishes that transcend cultural boundaries, making it a favourite among many diners. This study used the Delphi method to assess the rank of dish choices offered by Restaurant X. After obtaining approval from the restaurant's owner to conduct data collection, the study approached the restaurant's customers to rank the *nine masak lemak cili padi* dishes:

- smoked beef,
- chicken,
- duck,
- crab,
- *gulai pucuk*,
- *siput sedut*,
- smoked catfish,
- *telur itik*,
- fish/prawn.

We believe it is crucial to identify the most favored dishes so that Restaurant X can focus on the more popular dishes and expand its production according to the customers' preferences.

1.1 Nutritional Facts

Variations in fat content between different meats and seafood affect the final texture and taste of the *masak lemak cili padi* dish. The fat content of the meats or seafood used in *masak lemak cili padi* significantly affects the texture and flavour of the dish. Fat enhances flavour, improves mouthfeel, and stabilises the protein structure during cooking. In dishes using coconut milk as a base, meat or seafood with higher fat content can blend well with the rich, oily nature of coconut milk. This combination creates a smoother, creamier sauce, adding more depth and complexity to the flavour profile (16,17).

Changes in fat content can significantly affect the texture of dishes. Meats with higher fat content tend to be more tender and juicier after long cooking periods, as the melting fat helps to soften the protein fibers and lessen toughness. However, seafood usually has less fat, resulting in a leaner and often firmer texture. This difference requires changes in preparation, such as adjusting cooking times or adding more fatty ingredients (e.g., extra coconut milk) to obtain the desired sensory qualities (18). Research on sensory and textural analyses has shown that a balance between lean protein and fat is important. Reducing fat content may result in a less cohesive texture and diminished flavour intensity, as fat is key to releasing and enhancing aroma compounds during cooking (18,19).

The balance between the natural fat content of protein and coconut milk richness is essential in traditional *masak lemak cili padi*. A good balance keeps the meat or seafood tender, moist, and well-flavoured. Ingredient selection, particularly concerning the different fat compositions in meat and seafood, should be performed carefully to ensure the dish's sensory appeal and to maintain a consistent texture and taste that meets cultural expectations and nutritional needs. In addition, ingredient sourcing and quality are crucial in *masak lemak cili padi*, especially with regard to the freshness of coconut milk and the choice of chillies. This traditional Malaysian dish shows how the quality of ingredients affects flavour, texture, and health benefits.

Fresh coconut milk is essential in this dish, with a rich, creamy texture, and distinct flavour. It is important to differentiate between fresh and processed coconut milk, because they have different culinary uses. Fresh coconut milk, with its rich fat content and aromatic compounds, boosts the sensory qualities of Malay dishes, such *masak lemak cili padi* (20,21). Research has shown that fresh coconut milk enhances flavour and preserves nutritional quality better than convenient alternatives, typically offering reduced sensory and health benefits (20,21). Coconut milk can quickly lose quality at room temperature, affecting its flavour and nutritional value and underscoring the need for proper sourcing and storage (22,23).

The chilli in *masak lemak cili padi* are essential for determining the flavour and spiciness of the dish. Different chilli varieties offer unique flavour compounds and varying heat levels, ranging from a gentle 0 Scoville Heat Unit (SHU) to more than 1,000,000 SHU, which dramatically influences the taste experience. For chilli padi, the recorded SHU was 100,000–225,000 (24). Local availability and culinary traditions often influence the preference for certain chillies, highlighting the need for high-quality, fresh options. Studies have indicated that freshly sourced chillies offer sharper and more vibrant flavours than dried or older varieties (25).

Choosing high-quality ingredients such as fresh coconut milk and the right chillies is essential for achieving a perfect balance of richness, spiciness, and nutrition in *masak lemak cili padi*. This alignment improves the eating experience and showcases the cultural values of

food preparation in Malaysia, highlighting the importance of freshness and authenticity in local cuisine.

The nutritional profile of *masak lemak cili padi* can be understood by its key ingredients, including coconut milk, bird's eye chillies (*cili padi*), and the chosen protein, whether meat or seafood. The dish usually includes a rich sauce made from coconut milk, which adds to its energy content and fat composition.

Coconut milk is a creamy liquid that contains saturated fats and medium-chain triglycerides (MCTs), which add to its high calorie content. Research on modified *masak lemak* recipes has shown that changes in coconut milk concentration can influence the total fat content. One study showed that changing the dilution and emulsification of coconut milk could lower the total fat percentage and affect the balance of proteins and carbohydrates in the final emulsion (26). This indicates that cooking methods can be modified to customize the nutritional profile of the dish, possibly reducing the calorie density while maintaining appealing sensory qualities.

The protein source, whether from meat or seafood, provides moderate levels of high-quality protein and essential amino acids, with the total protein content differing depending on the specific type used. Research on various *masak lemak* variations indicates that similar dishes can have diverse fatty acid compositions. For instance, *masak lemak telur itik* and *masak lemak sotong* exhibit variations in the percentages of monounsaturated, saturated, and polyunsaturated fatty acids (27). These values apply to specific variants and show how the coconut milk base can affect the nutritional value of the protein element.

Bird's eye chillies (*cili padi*) provide a distinct spiciness and contain small amounts of vitamins, especially C, and bioactive compounds, such as capsaicinoids, which may support metabolism and offer antioxidant benefits. The spices and aromatics in *masak lemak cili padi* add small amounts of micronutrients and dietary fiber, improving the nutritional quality of the dish alongside macronutrients from coconut milk and protein.

A typical serving of *masak lemak cili padi* generally contains a high lipid content, primarily from saturated fats in coconut milk, and moderate amounts of mono- and polyunsaturated fatty acids, which can vary depending on the protein used and the cooking method. The source and quality of the meat or seafood shape a dish's moderate protein content, affecting its overall fatty acid profile (27). Reduced carbohydrate content, mainly from the natural sugars in coconut milk and small amounts from vegetables and spices, along with trace dietary fiber from *cili padi* and other ingredients adds a distinct flavour to the dish (26). The energy profile of modern versions can be lower than that of traditional versions if the recipe is adjusted to cut calories while maintaining the flavour intact (27).

Considering the characteristics of each main ingredient, choosing the appropriate ingredients and processing methods is crucial for balancing the nutritional quality (energy, fats, proteins, and carbohydrates) of *masak lemak cili padi*. This balance impacts health aspects and enhances the rich sensory profile of this traditional dishes.

2. Materials and Methods

The study aimed to identify and rank the *masak lemak cili padi* dishes offered at Restaurant X by using a two-round Delphi method (Figure 2). The usage of customers to provide input is the main novelty of this Delphi, as most studies involved participants with subject matter expertise (28,29). The Delphi method is an approach to organizing group communication based on anonymous individual responses (30). In a typical first round, the

researchers allowed participants to voice their thoughts openly, facilitating the collection of more thorough information. The replies were evaluated, and a constructed list was presented to the experts in the second-round instrument. In this study, the questions posed to the customers in the second round became smaller and more concentrated and were provided as a subject-specific open-ended questionnaire. The resulting ranked list was based on its perceived importance (31).

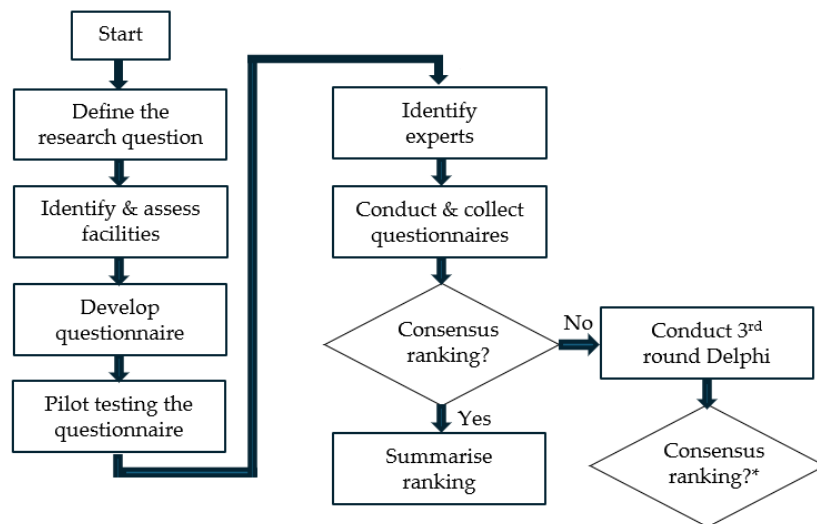


Figure 2. The Delphi process flow chart (32).

* = If consensus is not reached by the 3rd round of Delphi, the process will continue until consensus is achieved based on Kendall's W

In this study, we visited Restaurant X to confirm the various types of *masak lemak cili padi* dishes in the first round of the Delphi method. As mentioned earlier, nine types of *masak lemak cili padi* were offered at Restaurant X.

With this information, we applied the Delphi method by developing a closed-ended questionnaire for customers to rank the dishes based on a nine-point favourite scale to reflect the number of *masak lemak cili padi* dishes, where one is the most popular, while nine is the least popular. Several questions on the customer demographics were also included. The questionnaire was pilot-tested on three customers who ranked the dishes correctly, implying that the instrument could be easily understood and answered. We decided to print the questionnaires and ask the customers to answer them while waiting for their food to be delivered. This was done to avoid the problem of multiple ratings for the dishes that could impact the analysis (32).

There is no established formula for determining the number of participants required for the Delphi method. The Delphi panel size criteria should be between 20 and 30 panels, accommodating the study's goals, even if there is a restricted pool of specialists with knowledge of the study themes (33). For this study, we chose 30 customers who came to a group or family and were requested to participate in the Delphi study. During fieldwork, 30 customers agreed to answer the questionnaires, and all answered correctly. The study complied with the principles of the Declaration of Helsinki. The researchers reassured the participants that their names would not be recorded or mentioned in this study. Written

informed consent was obtained from each participant before data collection, and the purpose, methods, risks, and benefits of participating in the study were explained.

2.1. Kendall's Coefficient of Concordance

Kendall's coefficient of concordance (W) was used extensively in this work as a nonparametric statistical analysis to evaluate the degree of agreement among experts participating in the Delphi investigation (32). The data analysis included Kendall's W, which was designed to assess the level of agreement among a set of ranking scores, with particular attention paid to the p-value (34). According to Tee M, *et.al* (32), the statistical significance ($p < 0.05$) of Kendall's W indicates consensus among experts, and that the results are acceptable. Otherwise, it suggests that the results were insufficient. However, Rezaei M, *et.al* (34) proposed that the established threshold for claiming consensus is Kendall's W Coefficient $p < 0.05$, which serves as a reliable measure of the level of agreement required by the participants. The null hypothesis of this study was as follows:

Ho: The rankings of the customers are not in agreement.

3. Results and Discussion

Table 2 presents the demographic profiles of the 30 customers. Interestingly, 80% of the customers who ranked the menu were females, indicating that they assumed the role of the head of a group or family comprising to 2-7 members. This is a common feature of the Negeri Sembilan society, where the Minangkabau people are the largest matrilineal ethnic group. Most customers work in the private sector and are first-time visitors to Restaurant X (47%).

Table 2. Demography of the respondents.

Demography	Frequency	(%)
Gender		
Male	6	20
Female	24	80
Employment		
Government Sector	5	17
Private Sector	10	33
Self-employed	3	10
Unemployed	8	27
Student	4	13
Number of people accompanying		
2 to 4	13	43
5 to 7	13	43
More Than 7	4	13
Occurrence at Restaurant X		
First Time	14	47
Second Time	5	17
Third Time	3	10
More Than 3	8	26

In this study, variations in meat, such as beef rendang, chicken satay, duck curry, and crab sambal are particularly popular in Malay cuisine, complementing the rich, spicy flavours of coconut milk and bird's eye chilli. Smoked meat (salai) dishes enhance flavour and preservation through low, indirect heat cooking, which is a less effective technique for

seafood and vegetables (35). The preference for meat-based dishes in Malay cuisine can be attributed to economic factors, such as affordability and accessibility. Additionally, the unique ingredients of each region contribute to the distinctive characteristics of Malay cuisine. Preserving and transmitting culinary traditions is essential for sustaining Malaysia's cultural heritage. Table 3 presents the ranking of *masak lemak cili padi* dishes and the mean ranking for each dish. Kendall's coefficient of concordance (W) and the p-value also show the ranking of the 30 customers for the nine *masak lemak cili padi* dishes offered at Restaurant X. Based on the mean ranking (M), the four most popular *masak lemak cili padi* dishes were smoked beef (2.03), followed by chicken (3.17), smoked duck (3.87), and crab (5.10). *Gulai pucuk* (5.48) is ranked number five. The four least popular *masak lemak cili padi* dishes were smoked catfish (6.07), followed by *telur itik* (6.23), fish/prawn (6.37) and *siput sedut* (6.68). The $p < 0.001$ and Kendall's $W = 0.351$ imply that the null hypothesis can be rejected.

Table 3. Ranking results by the 30 customers.

Cus*	B*	C*	D*	Cr*	GP*	Cf*	TI*	FP*	SS*
C1	1	9	2	7	8	3	4	5	6
C2	2	3	1	5	4	8	9	6	7
C3	1	3	2	6	8	5	9	7	4
C4	1	3	2	6	8	5	9	7	4
C5	1	2	4	5	6	3	7	8	9
C6	8	1	2	3	4	5	6	7	9
C7	3	1	4	5	7	6	2	8	9
C8	7	2	1	4	6	3	5	9	8
C9	1	2	4	5	6	7	3	8	9
C10	1	2	5	4	3	8	6	7	9
C11	1	5	2	6	7	4	8	9	3
C12	2	1	3	9	5	8	6	7	4
C13	1	3	2	4	5	9	6	8	7
C14	3	2	1	6	8	4	9	5	7
C15	3	1	7	5	4	6	8	9	2
C16	1	2	3	6	5	8	4	9	7
C17	1	2	5	4	7	8	3	9	6
C18	1	2	6	4	8	9	7	3	5
C19	1	2	4	7	9	3	5	6	8
C20	2	4	3	7	1	8	5	6	9
C21	3	2	4	5	1	9	8	7	6
C22	3	6	8	7	4	9	5	1	2
C23	1	4	5	6	2	8	9	3	7
C24	5	2	6	1	4	8	7	9	3
C25	2	8	3	6	9	4	5	7	1
C26	1	3	7	9	4	5	6	4	2
C27	1	7	4	2	5	6	8	3	9
C28	1	3	6	4	5	9	7	8	2
C29	1	4	2	3	6	5	8	7	9
C30	1	4	7	2	5	3	6	8	9
Mean (M)	2.03	3.17	3.87	5.10	5.48	6.07	6.23	6.37	6.68
Group Rank	1	2	3	4	5	6	7	8	9
Kendall's W = 0.343492063p-value = 0.000									

*Note for smoked dishes: B = Beef, C = Chicken, D = Duck, GP = Gulai Puck, WC = Catfish, TI = Duck's Egg, FP = Fish/prawn, and SS = Siput Sedut, Cus = Customer

Human behaviour can be influenced in various ways by the complexities associated with food selection. These could include foods that are excellent in taste owing to their freshness, ease of acquisition, immediate preparation, and traditional food with distinct ingredients, such as spices and flavours (36). *Masak lemak cili padi* with smoked beef has become the most popular dish in Restaurant X, with $M=2.03$. Meat is essential to human diet and provides valuable nutrients and high-quality proteins that benefit health (37). Smoking technologies can preserve meat products by penetrating them with volatiles from wood thermal combustion, to improve the taste of *masak lemak cili padi* smoked beef. This method can preserve the aroma of the smoke. Next, *masak lemak cili padi* with chicken were ranked second most popular, with $M=3.17$. This is not surprising, as Malaysia now has the highest per capita consumption of poultry meat in Asia and the third highest in the world (38).

Masak lemak cili padi with smoked ducks ranked third with ($M=3.87$). Smoked duck meat is less popular than smoked meat and chicken owing to its higher price. Currently, in the Malaysian market, the cost of smoked ducks ranges from RM35 (USD 7.60) to RM45 (USD 9.75) per bird. Customers view this as expensive. *Masak lemak cili padi* with crab is ranked fourth with $M=5.10$ owing to its high price (RM60 or USD13.00 per kilogram). In addition, eating crab is a cumbersome and messy process (39).

The fifth most popular dish was *masak lemak cili padi* with *gulai pucuk* ($M=5.48$). *Gulai pucuk* uses either *pucuk ubi* (cassava leaves) or *pucuk paku* (ferns), which are two traditional plants that appeal more to older generations (2). The four *masak lemak cili padi* dishes with the lowest ranking were smoked catfish (6.07), followed by *telur itik* (6.23), fish/prawn (6.37) and *siput sedut* (6.68). Poor rankings are recognized because of the dishes' price and availability. In addition, *siput sedut* or obtuse horn shell is a sea snail that requires the snail to be immersed in clean water for at least 24 h to ensure that the mucus and mud from the snail comes out, which makes *masak lemak cili padi* with *siput sedut* to be very cumbersome, time-consuming, and costly.

4. Conclusions

The demographic research at Restaurant X suggests ways to expand its client base and enhance its appeal. The clientele is female, mainly government workers, with limited patronage from younger customers, such as students. Restaurant X might attract younger customers by introducing innovative *masak lemak cili padi* variations, such as spaghetti aglio e olio with a local twist, or grilled beef marinated in *cili padi* sauce. Increased exposure of *masak lemak cili padi* could boost its cultural relevance in Negeri Sembilan. Further studies, including interviews and observations, could provide deeper insights into customer interest and help popularise this cuisine outside Negeri Sembilan.

Further research might examine Restaurant X's *masak lemak cili padi* products and customer satisfaction, revealing new flavours or cooking methods. Restaurant X could improve customer satisfaction by modernising restrooms and optimising payment counters. A retort-processed, ready-to-eat *masak lemak cili padi* would increase accessibility to domestic and international markets, ensuring the dish's cultural effect and culinary legacy. Modernising *masak lemak cili padi* while retaining its authenticity needs a delicate balance of modern culinary methods and traditional flavours and culture.

A viable strategy is culinary fusion, which involves updating the meal to meet modern aesthetic and dietary needs while retaining its flavour and scent, using techniques such as molecular gastronomy or creative plating. This modern-traditional fusion approach

preserves *masak lemak cili padi*'s creamy coconut milk foundation and characteristic heat. Another method to adapt is to selectively substitute or improve specific items while remaining true to the original recipe. Integrating modern alternative protein sources can match nutritional and sustainability trends while retaining the texture and flavour of meat or seafood. Optional proteins are rarely utilised, but careful reformulation could offer health-conscious consumers a new option.

The potential to modernise *masak lemak cili padi* is full of possibilities. It focuses on keeping its core elements-fresh coconut milk, authentic spices, and the signature heat from *cili padi*-while adding modern touches in presentation and ingredient preparation. Chefs and food innovators can create modern versions of *masak lemak cili padi* by using culinary fusion techniques and exploring innovative ingredient substitutions while respecting traditional preparation methods, satisfying contemporary tastes and cultural authenticity.

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Author Contributions

A.R. Conceptualised, Designed and Wrote the Manuscript; S.S. Led the Data Collection in Negeri Sembilan and Reviewed the Manuscript; B.K. and N.A.S. Participated in the Data Collection and Reviewed the Manuscript; I.H.A. and N.H.M.N. Reviewed the Manuscript and Provided Advice on Data Analysis and Interpretation.

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Institutional Review Board Statement

The participants obtained the necessary consent, and their anonymity was secured. All procedures performed in this study involving human participants followed the ethical standards of the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Data Availability Statement

Invalid.

Conflicts of Interest

The authors acknowledge that no ethical issues were involved in this study.

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