

Identifying customer preferences for taufu-fa variants using Analytic Hierarchy Process methodology

(Mengenali pasti preferensi pelanggan bagi varian taufu-fa menggunakan metodologi Proses Hierarki Analitik)

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Abstract

This study investigates consumer preferences for taufu-fa, a traditional Malaysian dessert made from soft tofu, in order to provide empirical insights that can guide product development and marketing strategies. Identifying these preferences is crucial, as consumer food choices are largely shaped by sensory attributes and cultural values. A quantitative research design was adopted using the Analytic Hierarchy Process (AHP), implemented through the SpiceLogic application. A total of 150 respondents in Melaka were surveyed through structured questionnaires. Three key sensory attributes; taste, colour and texture were evaluated. Pairwise comparisons and eigen value computations were applied to generate priority values, while consistency ratios ($CR < 0.1$) ensured reliable judgments. The analysis revealed that taste was the most influential attribute (weight = 0.45), followed by colour (0.28) texture (0.27). Among the three variants, *gula kabung* taufu-fa ranked highest with an overall priority value of 0.43, followed by plain (0.32) and corn-flavoured (0.25). Specifically, *gula kabung* scored 0.42 for taste, 0.48 for colour and 0.45 for texture, consistently outperforming the other two variants. Sensitivity analysis confirmed the stability of these results across different weighting scenarios. Although limited by sample size and geographical scope, the findings demonstrate the potential of *gula kabung* taufu-fa as the flagship product in the traditional dessert market. Future research should expand to larger and more diverse populations and include additional factors such as pricing, packaging and nutritional perceptions.

Introduction

Taufu-fa is a traditional Malaysian dessert made from soft tofu that has maintained strong cultural significance while gaining renewed popularity in recent years. Its simple preparation, affordability and adaptability with different flavours make it not only a staple delicacy but also a product

with commercial potential in the food and beverage sector. With increasing consumer interest in authentic, locally inspired desserts, identifying which variants of taufu-fa are most appealing to customers is crucial for guiding product development and marketing strategies.

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Despite its cultural relevance and wide acceptance, systematic studies on taufu-fa are still limited, especially in terms of understanding consumer preferences using structured analytical methods. Most small-scale producers rely on assumptions or anecdotal evidence when deciding which variants to produce. This lack of data-driven insights often leads to mismatched offerings, reduced customer satisfaction and missed economic opportunities. The problem therefore lies in the absence of a clear and structured evaluation of which sensory attributes—taste, colour and texture—most strongly influence consumer preferences which specific taufu-fa variant holds the greatest market potential.

To systematically analyse these preferences, this study employs the Analytic Hierarchy Process (AHP), a multi-criteria decision-making tool developed by Saaty (1980). The AHP framework is particularly well-suited to food preference studies as it allows qualitative and subjective sensory evaluations to be quantified into structured priority values. By breaking down complex decision-making into a hierarchy of goal, criteria and alternatives, AHP enables a transparent and reliable comparison across product variants.

In summary, this research focuses on identifying consumer preferences for three taufu-fa variants; *gula kabung* (palm sugar), plain and corn-flavoured based on three sensory attributes: taste, colour and texture. The goal of this study is to determine the most preferred variant and to provide actionable insights for small-scale food entrepreneurs to align their production and marketing strategies with consumer expectations. More broadly, the paper highlights how the integration of AHP can contribute to food product development by offering a structured, evidence-based approach to understanding consumer behaviour.

Literature review

Consumer food choice: Sensory and contextual drivers

Consumer food choice is a multidimensional phenomenon shaped by both intrinsic sensory qualities and extrinsic contextual factors. Among these, sensory attributes such as taste, colour, aroma and texture consistently emerge as the strongest drivers of consumer preference and repeat purchase intention (Drake et al. 2023). Sensory satisfaction forms the immediate and tangible basis of product acceptance, while contextual dimensions such as cultural identity, health perceptions and psychological expectations—act as reinforcing or moderating factors in consumer decision-making (Steenkamp 2019).

Empirical evidence shows that taste is the single most important criterion, accounting for more than 70% of food-purchase decisions globally (Malaysian Food Industry Report 2019). Colour and visual appearance are also critical because they create expectations of freshness and quality before consumption begins (Delwiche 2012). Texture, meanwhile, contributes to the overall multisensory experience by reinforcing perceptions of indulgence, naturalness or authenticity in a given food product (Tuorila et al. 2009). These sensory drivers align with previous work on traditional Malaysian foods, where attributes such as smoothness, creaminess and appealing colour tones were found to significantly predict consumer liking (Fei Tan et al. 2020).

Contextual and cultural factors play an equally important role. Research indicates that consumers often associate traditional foods with heritage, nostalgia and authenticity, which amplify their sensory evaluation outcomes (Guerrero et al. 2010). In Malaysia, the rising demand for locally inspired desserts reflects not only hedonic enjoyment but also the cultural symbolism of traditional foods as a medium for identity and memory

(Muh. Zulkifli Murfat et al. 2023). This is supported by a documented 35% growth in demand for traditional desserts in the last five years, demonstrating how cultural associations magnify sensory-driven choices (Muh. Zulkifli Murfat et al. 2023).

Furthermore, health perceptions interact with sensory preferences in shaping food choice. While consumers are willing to prioritise flavour, they increasingly demand natural and less-processed products that are framed as healthier (Eka Rachma Kurniasi et al. 2021). For instance, palm sugar (*gula kabung*) is often perceived as a more natural and nutritious sweetener compared to refined sugar, thereby reinforcing both the cultural authenticity and health positioning of products using it. This perception adds another layer of consumer motivation beyond immediate sensory gratification.

Finally, psychological and situational factors such as price sensitivity, purchasing environment and social influence further contextualise consumer choice. Uyeda et al. (2016) found that while sensory attributes dominated first-choice decisions, repeat purchase behaviour was significantly moderated by affordability and peer recommendations. These findings suggest that food choice is not only a matter of sensory preference but also a function of broader social and economic conditions.

Taken together, the literature establishes that sensory qualities—particularly taste—remain the foundation of food choice, but these are continually reinforced and reshaped by cultural identity, health expectations and social context. For traditional desserts such as *taufu-fa*, this means that product acceptance is not merely about hedonic enjoyment but also about how effectively the dessert resonates with heritage values and evolving health-conscious lifestyles.

Sensory attributes as primary determinants

Sensory attributes such as taste, colour and texture have consistently been identified as the primary determinants of consumer acceptance and preference in food products. Among these, taste is almost universally acknowledged as the most decisive factor. Numerous studies demonstrate that flavour intensity, sweetness, bitterness, or distinctive profiles directly affect consumer satisfaction and subsequent repurchase intentions. For example, Cicia et al. (2010) showed that taste-related attributes were the strongest predictors of repurchase likelihood across various food categories. Similarly, in the Malaysian context, Eka Rachma Kurniasi et al. (2021) reported that consumers expressed a clear preference for palm sugar due to its natural caramel-like sweetness, with nearly half of respondents (48%) indicating it as their favoured sweetener in traditional cuisine. This finding is particularly relevant to the present study since *gula kabung* emerged as the most dominant *taufu-fa* variant in the empirical results.

The role of colour in food preference has also been widely recognised. Colour often serves as a visual cue for freshness, quality and even flavour expectations before tasting occurs. As highlighted in the Malaysian Food Industry Report (2019), 68% of consumers indicated that colour significantly influenced their purchasing decision, second only to taste (72%). Empirical evidence from Uyeda et al. (2016) further confirms that visually appealing products are more positively evaluated, even in blind tests where flavour differences are minor. In traditional desserts, natural golden or brownish hues are often associated with authenticity and indulgence, which explains why the golden-brown colour of palm sugar-based *taufu-fa* consistently appealed to consumers.

In addition, texture plays a critical role in shaping the overall sensory experience, particularly for soft desserts such as *taufu-fa*. Smoothness, creaminess

and mouthfeel often determine perceptions of indulgence and satisfaction. Fei Tan et al. (2020) in their sensory evaluation of Malaysian food products, found that texture was a significant determinant of hedonic liking, especially in soy-based desserts and puddings. Other studies on dairy and yoghurt products (Krasnova et al. 2022) also revealed that consumers placed strong emphasis on textural attributes, often rating creaminess and smooth consistency as second only to taste. These findings underscore the importance of including texture as a distinct criterion in preference modelling.

From a broader perspective, sensory attributes are not merely superficial qualities but act as proxies for cultural authenticity and product quality. Muh. Zulkifli Murfat et al. (2023) observed a 35% increase in demand for traditional Malaysian desserts within five years, attributing this growth partly to sensory-driven nostalgia and cultural pride. For products like *taufu-fa*, which carry cultural heritage significance, the interplay of taste, colour and texture is thus doubly important: it determines immediate consumer satisfaction while simultaneously reinforcing the perception of authenticity.

Taken together, existing evidence indicates that taste dominates food preferences, with colour and texture serving as secondary but still highly influential attributes. The consistency of these findings across both international and Malaysian contexts provides a strong justification for selecting taste, colour and texture as the focal criteria in the current study's Analytic Hierarchy Process (AHP) framework. By systematically quantifying these sensory judgments, AHP allows for a deeper understanding of how consumers prioritise different product qualities when evaluating traditional desserts such as *taufu-fa*.

Approaches to modelling food preferences

Understanding consumer food preferences requires methodological approaches that can capture both the subjective nature of sensory experience and the objective factors influencing choice. Over the years, several modelling techniques have been developed, each with strengths and limitations depending on the research context.

One widely used method is hedonic rating, where consumers score products on a Likert or category scale (e.g., 1 = dislike extremely, 9 = like extremely). Hedonic testing provides a simple measure of product liking but does not allow for the decomposition of preferences into underlying criteria (Stone et al. 2012). Consequently, while useful for general consumer acceptance testing, hedonic ratings lack the diagnostic power needed to understand trade-offs among attributes.

Preference mapping, both internal and external is another common technique. Internal preference mapping employs principal component analysis to summarise consumer preference data, whereas external mapping incorporates product sensory descriptors to interpret consumer liking patterns (Hawkin et al. 2022; Varela et al 2012). For example, external preference mapping has been successfully used to link the sensory profiles of beverages such as fruit juices and ready-to-drink teas to consumer liking (Lawless et al. 2010). However, while preference mapping provides visual representation of product positioning, it does not generate explicit weights for decision criteria, limiting its usefulness for managerial decision-making.

In contrast, conjoint analysis offers a way to quantify trade-offs by presenting respondents with different product profiles and estimating the relative importance of each attribute (Green et al. 1990). Conjoint has been extensively applied in food marketing research, for instance in evaluating tea beverages (Wang et al. 2022) and dairy products (Maximo 2008).

The method excels in simulating consumer choices in market-like conditions. Yet, conjoint analysis typically requires large sample sizes and complex experimental designs, which may not be feasible in small-scale or traditional food research settings.

An alternative is the application of multi-criteria decision-making (MCDM) techniques, such as the Analytic Hierarchy Process (AHP). Unlike hedonic or conjoint approaches, AHP explicitly structures decision-making into a hierarchy of goal, criteria and alternatives, allowing researchers to quantify subjective judgments through pairwise comparisons (Saaty 1980; Saaty & Vargas 2012). Its key advantage lies in the ability to capture consumer perceptions in situations where multiple sensory attributes (e.g., taste, colour, texture) interact, while also testing for logical consistency through the consistency ratio (CR). Recent studies have demonstrated that AHP can effectively integrate sensory judgments with product evaluation, making it especially relevant for traditional food contexts where cultural perceptions are as important as sensory experience (Kallas et al. 2009; Blešić et al. 2021; Baviera-Puig et al. 2023).

Overall, these approaches complement one another, but their suitability depends on research goals. Hedonic testing and preference mapping provide broad consumer insights, conjoint simulates real-market choices, while AHP and other MCDM tools offer structured and transparent weighting of criteria. For this study, AHP is particularly appropriate because it addresses the need to evaluate trade-offs among sensory attributes of taufu-fa variants in a systematic and quantifiable manner.

The Analytic Hierarchy Process (AHP)

The Analytic Hierarchy Process (AHP), developed by Saaty in the late 1970s, is one of the most widely applied multi-criteria decision-making (MCDM) techniques for structuring and solving complex problems involving multiple, often conflicting criteria (Saaty 1980). The central strength of AHP

lies in its ability to decompose a decision problem into a hierarchical structure consisting of three main levels: the goal (e.g., to determine the most preferred food product), the criteria (e.g., taste, colour, texture) and the alternatives (e.g., *gula kabung*, plain, corn-flavoured taufu-fa). This hierarchical framework allows researchers to systematically analyse subjective judgments and transform them into quantifiable priority values (Saaty & Vargas 2012).

The pairwise comparison mechanism is the cornerstone of AHP. Respondents are asked to compare two alternatives or criteria at a time and express the strength of their preference on a numerical scale (typically 1 to 9), where 1 represents equal importance and 9 represents extreme preference of one over the other (Brunelli 2015). These comparisons are then arranged into matrices, from which Eigen values and Eigenvectors are computed to derive priority weights. The principal Eigenvector, in particular, reflects the relative importance of the elements being compared (Saaty 2003).

An important feature of AHP is its built-in consistency check. The Consistency Ratio (CR) is calculated to assess whether judgments are logically coherent; if the CR is below 0.10, the comparisons are considered acceptably consistent (Saaty 1980; Saaty 2008). This step provides a level of methodological rigour that distinguishes AHP from other consumer preference methods such as hedonic scoring or simple descriptive statistics, which do not explicitly verify the logical consistency of responses (Ishizaka et al. 2011).

AHP has been increasingly used in food and sensory studies because of its dual ability to handle both qualitative judgments and quantitative data. For example, Krasnova et al. (2022) applied AHP to evaluate freeze-dried yoghurt preferences and found that taste outweighed texture and appearance in influencing consumer decisions. Similarly, Baviera-Puig et al. (2023) combined AHP with sensory panel evaluations for stone fruits, confirming

that sweetness and flavour were the most decisive attributes. These applications highlight how AHP can capture subtle consumer perceptions that might otherwise be overlooked by conventional statistical approaches.

Compared to other multi-criteria approaches such as conjoint analysis or preference mapping, AHP is particularly advantageous when the goal is to weight sensory criteria explicitly and to produce a clear ranking of product alternatives. Conjoint analysis is often better suited for simulating trade-offs in hypothetical market scenarios, while preference mapping provides visual clustering of consumer liking. In contrast, AHP is more appropriate when research aims to establish a transparent, logically consistent and replicable priority structure (Ishizaka 2019).

For these reasons, AHP has been described as both a decision-support tool and a knowledge-structuring framework, bridging the gap between subjective consumer perception and objective prioritisation (Vargas 1990). In the context of traditional food studies such as *taufu-fa*, where cultural authenticity and sensory qualities play dominant roles, AHP provides a robust methodology to not only capture consumer preferences but also generate actionable insights for entrepreneurs and food producers.

AHP in food and beverage preference research: What has been done?

The application of the Analytic Hierarchy Process (AHP) in food and beverage studies has gained significant traction over the past two decades, as researchers increasingly recognise its utility in addressing the multidimensional nature of consumer preferences. Unlike traditional sensory analysis that relies heavily on descriptive statistics or hedonic scales, AHP enables the systematic comparison of alternatives against multiple criteria, producing transparent and reproducible priority weights. This feature has proven

particularly useful in food studies where consumers' decision-making is influenced by both intrinsic sensory qualities and extrinsic product attributes (Kallas et al. 2009).

Several empirical studies have demonstrated the effectiveness of AHP in capturing consumer perceptions in diverse food contexts. For instance, Fogliatto et al. (2003) introduced an AHP-based sensory data collection protocol, demonstrating how pairwise comparison matrices improved the consistency of panellist judgments compared to conventional rating scales. Their findings underscored the advantage of AHP in structuring subjective inputs from sensory panels into quantifiable data. Similarly, Baviera-Puig et al. (2023) applied a hybrid approach combining sensory panel assessments with AHP to evaluate stone fruits such as peaches and nectarines. Their results revealed that taste and sweetness were consistently ranked as the most critical attributes, confirming the robustness of AHP in aligning subjective sensory responses with consumer-driven priorities.

Beyond fresh produce, AHP has also been used to assess consumer acceptance of processed and functional foods. Alicia et al. (2011) employed AHP to evaluate freeze-dried yoghurt, finding that taste emerged as the strongest driver of preference, followed by texture and appearance. This finding reinforced the common hierarchy of sensory attributes observed in other food categories. Similarly, Alicia et al. (2011) applied AHP in the context of health-oriented yoghurts enriched with digestive benefits. Their study revealed that health functionality could outweigh taste in determining preference, thus illustrating the flexibility of AHP in incorporating both hedonic and functional product attributes.

Applications of AHP have also extended into traditional and culturally embedded food choices. Blešić et al. (2021), for example, used AHP to study consumer decision-making in relation to traditional Vojvodina foods in Serbia. Their findings highlighted that *sensory appeal* was ranked

as the most influential criterion, surpassing considerations of health and price. This result is particularly relevant for studies on traditional desserts such as taufu-fa, as it indicates that authenticity and sensory satisfaction remain central drivers of consumer choice. In the Malaysian context, although Eka Rachma Kurniasi et al. (2021) did not directly use AHP, their survey on palm sugar (*gula kabung*) preferences revealed strong consumer attachment to traditional sweeteners, providing a strong rationale for incorporating AHP to test such variants in traditional desserts.

Moreover, AHP has proven effective in decision-making beyond individual products by examining broader food-related contexts, such as supplier selection and restaurant choice. Studies on citrus fruits and orange suppliers applied AHP to evaluate multiple quality parameters, offering actionable insights for supply chain decision-making (Uyeda et al. 2016). Likewise, research on coffee products and coffee shop preferences integrated AHP to prioritise quality, price and sustainability attributes, showing that AHP can adapt across food sectors to balance consumer and producer perspectives (Brans et al. 2005).

Collectively, these studies demonstrate that AHP is a versatile and rigorous tool for analysing food preferences. Across contexts ranging from fresh produce to traditional desserts and functional foods, AHP consistently reveals that taste is the dominant driver of consumer choice, while still allowing for the integration of secondary attributes such as texture, colour, price and health benefits (Cicia et al. 2010; Kallas et al. 2009). However, despite its growing use internationally, there remains a paucity of studies applying AHP to Southeast Asian traditional desserts. This gap underscores the novelty of the present study, which applies AHP to systematically evaluate consumer preferences for taufu-fa variants in Malaysia.

Why AHP is chosen for this study

The Analytic Hierarchy Process (AHP) was selected for this study because it offers a systematic and transparent framework to evaluate consumer preferences for food products, particularly when decisions are influenced by multiple sensory attributes such as taste, colour and texture. Unlike simple descriptive statistics or hedonic rating scales, AHP is capable of transforming subjective judgments into quantifiable priority values through pairwise comparisons, thus ensuring that consumer perceptions are not only captured but also structured in a way that highlights their relative importance (Saaty 1980; Saaty et al. 2012). This is especially relevant in food preference research, where subjective sensory evaluations must often be translated into actionable insights for product development and marketing strategies.

Another reason for choosing AHP lies in its robustness in handling small to medium sample sizes typical of sensory studies. While traditional multivariate methods such as conjoint analysis or preference mapping require large datasets to generate reliable results, AHP is suitable for research contexts where respondents are limited but provide rich qualitative judgments (Kallas et al. 2009). In the present study, with 150 respondents from the Melaka region, AHP provides an ideal balance between methodological rigour and practical feasibility. The built-in consistency ratio (CR) further enhances reliability by checking whether respondents' judgments are logically consistent, an advantage rarely available in other preference analysis techniques (Saaty 2003).

Past applications of AHP in food-related contexts have consistently demonstrated its ability to capture nuanced consumer preferences across multiple criteria. For instance, Baviera-Puig et al. (2023) used AHP to evaluate stone fruit quality attributes and found that the method effectively integrated sensory and commercial considerations.

Similarly, Krasnova et al. (2022) applied AHP to freeze-dried yoghurt and revealed that taste dominated consumer decision-making, confirming the method's sensitivity in prioritising key sensory drivers. These examples underscore AHP's versatility and reliability in contexts that are closely aligned with the present research on *taufu-fa*.

From a practical perspective, AHP was also chosen because it allows researchers and entrepreneurs to model consumer decision-making hierarchically — from overall goals (identifying the most preferred variant) down to criteria (sensory attributes) and alternatives (specific flavours). This structure mirrors the actual thought processes of consumers, making the outcomes more intuitive and actionable for business decision-makers (Brans et al. 2005). For small-scale entrepreneurs in Malaysia who rely heavily on aligning product development with consumer expectations, the clarity and transparency offered by AHP make it an invaluable decision-support tool.

In summary, AHP is uniquely suited for this study because it provides methodological rigour, accommodates the subjective and multidimensional nature of food preferences, ensures logical consistency in judgments and has a proven track record in previous food studies. By adopting AHP, this research bridges the gap between traditional dessert authenticity and modern analytical methods, generating results that are both academically credible and practically relevant for the food industry.

Research gap and contribution

Although there is a considerable body of literature on consumer preferences in the food and beverage sector, studies that apply structured multi-criteria decision-making (MCDM) tools such as the Analytic Hierarchy Process (AHP) to traditional desserts remain limited. Most prior works have focused on staple foods, fruits, dairy products or beverages. For instance, AHP has been applied to evaluate supplier

selection in citrus fruits (Uyeda et al. 2016), to prioritise sensory attributes in yoghurt (Alicia et al. 2011) and to assess overall appeal in traditional regional cuisines (Blešić et al. 2021). While these studies confirm that AHP is a robust tool for systematically capturing consumer preferences, they often emphasise global or industrial food products rather than locally embedded traditional desserts.

Furthermore, previous research in the Malaysian context has concentrated largely on descriptive surveys of consumer taste preferences without integrating structured decision-making models. For example, Eka Rachma Kurniasi et al. (2021) demonstrated that *gula kabung* (palm sugar) is perceived more positively than other sweeteners in Malaysian cuisine. Similarly, Muh. Zulkifli Murfat et al. (2023) reported a growing demand for traditional desserts, driven by nostalgia and cultural identity. However, such studies relied mainly on descriptive statistical approaches and did not quantify the relative weights of different sensory attributes such as taste, colour and texture. This methodological gap limits their usefulness for guiding precise product development strategies.

A systematic review by Kallas et al. (2009) further noted that, while AHP has been increasingly used in food research, its application to traditional Southeast Asian desserts is almost absent. This is a critical omission, as traditional desserts are not only culturally significant but also represent a growing market segment aligned with consumer interest in heritage-based and locally inspired foods ((Muh. Zulkifli Murfat et al. 2023)). The absence of structured models in this domain creates an opportunity to bridge consumer behaviour insights with entrepreneurial product innovation.

Against this backdrop, the present study contributes in three key ways. Firstly, it extends the application of AHP to a traditional soy-based dessert, *taufu-fa* which has not been studied previously using this methodology. Secondly, it quantifies

consumer preferences across three core sensory attributes; taste, colour and texture providing a more nuanced and actionable understanding of decision-making drivers than descriptive statistics alone. Thirdly, it offers practical insights for small-scale food entrepreneurs by demonstrating how systematic prioritisation of product variants can inform targeted production, packaging and marketing strategies.

In doing so, this study not only fills a methodological gap but also advances the academic conversation on the use of decision-support tools in food preference studies. More broadly, it underscores the potential of AHP to align traditional food authenticity with modern consumer expectations, thereby contributing to both scholarship and practice in sustainable food entrepreneurship.

Methodology

Research design

This study adopted a quantitative research design to systematically evaluate consumer preferences for taufu-fa variants. Quantitative research is particularly suitable when the objective is to collect measurable data that can be statistically analysed to reveal patterns, relationships and generalisable insights (Creswell et al. 2022). By employing a structured approach, this design ensures that consumer preferences are not merely anecdotal but are instead supported by robust empirical evidence.

The core methodology utilised was the Analytic Hierarchy Process (AHP), a multi-criteria decision-making (MCDM) tool introduced by Saaty (1980). AHP was selected because consumer food preferences often involve multiple subjective criteria, such as taste, colour and texture, which cannot be adequately captured through single-variable analysis (Brans et al. 2005). Unlike descriptive statistics alone, which provide only a surface-level understanding, AHP decomposes complex decision problems into a hierarchical structure, thereby allowing for systematic comparison

across alternatives (Saaty et al. 2012). This methodological advantage is crucial in food studies where sensory evaluation plays a dominant role in shaping consumer decisions (Cicia et al. 2010).

Furthermore, AHP provides an effective mechanism to transform subjective judgments into quantitative values, ensuring a balance between qualitative consumer perceptions and quantitative analysis (Kallas et al. 2009). This makes it especially relevant to food preference studies where sensory attributes are highly personal yet must be aggregated into actionable data for producers and marketers. In addition, AHP's ability to assess the consistency of respondent judgments through the Consistency Ratio (CR) enhances methodological rigour, thereby strengthening the validity and reliability of the findings (Saaty 1980; Saaty et al. 2012).

The decision to use AHP in this study is also supported by recent applications in food research. For instance, studies have successfully employed AHP to evaluate rice varieties, fruit juices and other traditional foods, demonstrating its adaptability in capturing consumer-driven priorities in diverse cultural contexts (Kallas et al. 2009; Fei Tan et al. 2020). Thus, the AHP approach was deemed not only suitable but also innovative in its application to taufu-fa, a traditional Malaysian dessert.

In summary, the adoption of a quantitative design, operationalised through the AHP framework, ensured that the research could provide systematic, replicable and statistically valid insights into consumer preferences. This structured decision-making approach allows traditional dessert producers to align product strategies with evidence-based consumer demands, thereby enhancing competitiveness in the Malaysian food industry (Muh. Zulkifli Murfat et al. 2023).

Sampling and justification

The study utilised a sample size of 150 respondents, which was determined based on both methodological and practical

considerations. In consumer preference studies, a sample size of 100 – 200 respondents is generally regarded as sufficient to capture diverse opinions while ensuring reliable statistical interpretation (Kallas et al. 2009). A sample of 150 therefore provided a balance between statistical robustness and feasibility, allowing for meaningful analysis without overextending time and financial resources. Furthermore, the choice aligns with previous food preference studies in Malaysia, which have employed similar sample sizes to capture consumer heterogeneity while maintaining manageable data collection procedures (Muh. Zulkifli Murfat et al. 2023).

The sample was drawn using a convenience sampling approach, which involves selecting respondents who are readily accessible to the researchers. This technique was chosen due to its suitability for exploratory research in consumer behaviour, particularly when the focus is on generating preliminary insights rather than producing fully generalisable results (Etikan et al. 2016). Convenience sampling was also practical in this study, as the research targeted taufu-fa consumers at night markets, food stalls and retail outlets in Melaka, where the product is widely available. These settings ensured that respondents had direct and recent experience with the product, increasing the validity of their sensory evaluations.

Despite the limitations of convenience sampling such as potential sampling bias and limited generalisability—the method is widely acknowledged in exploratory food research for its efficiency in gathering responses within real-world consumer contexts (Uyeda et al. 2016). Moreover, Melaka was strategically chosen as the study location because of its rich culinary culture and strong heritage food consumption patterns, making it an ideal site for evaluating traditional desserts like taufu-fa (Fei Tan et al. 2020). The diversity of respondents in terms of age (18 – 65 years), gender (male and female) and locality (residents and visitors) helped to mitigate some of the shortcomings of convenience sampling by ensuring broader representation.

In sum, the decision to use 150 respondents through convenience sampling was methodologically justified. It provided a sufficiently large dataset to apply the Analytic Hierarchy Process (AHP), which requires multiple pairwise comparisons and consistency checks to be meaningful (Saaty 1980; Saaty et al. 2012). At the same time, it ensured that the study remained feasible in terms of time, cost and logistical constraints, while still producing results that are both reliable and relevant to local entrepreneurs and small-scale food producers.

Research framework

The research was guided by the following framework:

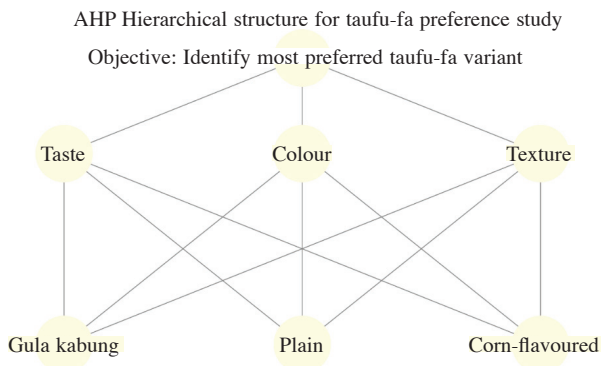


Figure 1. AHP hierarchy for taufu-fa preferences

Questionnaire design

A structured questionnaire was developed with two sections:

- Section A (demographics): Age, gender, purchase frequency, familiarity with taufu-fa.
- Section B (sensory evaluation): Respondents evaluated the three variants (*gula kabung*, plain, corn) on a 5-point Likert scale (1 = Very Poor, 5 = Excellent) for taste, colour and texture.

Application of Analytic Hierarchy Process (AHP)

The AHP analysis followed eight steps:

- Define the Goal: Identify the most preferred taufu-fa variant.
- Develop the Hierarchy:
 - Level 1: Goal.
 - Level 2: Criteria (taste, colour, texture).
 - Level 3: Alternatives (*gula kabung*, plain, corn).
- Construct Pairwise Comparison Matrices: Respondents compared alternatives two at a time using Saaty's 1 – 9 scale (1 = equal importance, 9 = extreme importance).
- Calculate Priority Weights: Eigen value method was applied to derive relative weights for each criterion and alternative.
- Check Consistency: The Consistency Ratio (CR) was calculated to ensure judgments were reliable (acceptable if $CR < 0.1$).
- Aggregate Judgments: Results from all respondents were synthesised to generate overall weights.
- Synthesise Final Ranking: Weighted scores across taste, colour and texture were combined to determine the final ranking of variants.
- Conduct Sensitivity Analysis: Criteria weights were varied ($\pm 10\%$) to test the stability of the results.

Consistency measurement in AHP

- AHP requires internal consistency in judgments.
- The Consistency Index (CI) and Consistency Ratio (CR) were calculated:

$$CI = \frac{\lambda_{max} - n}{n - 1}, \quad CR = \frac{CI}{RI}$$

Where:

- λ_{max} = principal Eigen Value
- n = number of items compared
- RI = random index
- A $CR < 0.1$ indicates acceptable consistency (Saaty et al. 2012)
- In this study, CR values ranged between 0.03 – 0.08, confirming reliable judgments

AHP decision hierarchical structure

Goal: Identify most preferred taufu-fa variant

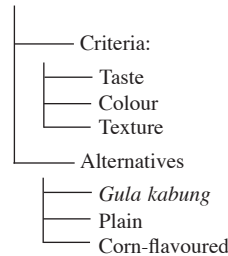


Figure 2. AHP hierarchy for taufu-fa preferences

Quality control measures

To ensure the robustness and reliability of the methodology, several quality control measures were systematically implemented throughout the research process.

Pre-testing of questionnaire

Before the main survey distribution, the questionnaire was pilot-tested with 20 respondents to check for clarity, comprehensibility and relevance of items. Pre-testing is a standard approach in survey-based research to identify ambiguous wording, redundant items and potential biases (Creswell et al. 2022). This step

helped refine the instrument to ensure that respondents interpreted the sensory evaluation scales consistently and accurately.

Clear instructions and examples

Respondents were given detailed instructions, including examples of pairwise comparisons using the Saaty (1 – 9) scale, to reduce misinterpretation. Providing clear guidelines enhances response validity and lowers the risk of inconsistent judgments.

Data entry verification

All responses were entered into the database with a double-entry verification system, where data was keyed in twice by two independent individuals and cross-checked for discrepancies. This process minimised human error, an essential aspect of data quality assurance in consumer studies (Hair et al. 2010).

Consistency ratio (CR) checks in AHP

Within the AHP framework, consistency ratios (CR) were computed for each pairwise comparison to assess the reliability of judgments. According to Saaty (1980), a CR value below 0.10 indicates that respondents' judgments are acceptably consistent. In this study, CR values ranged between 0.03 and 0.08, confirming that the majority of responses were coherent and suitable for aggregation. Ensuring consistency is crucial because inconsistent judgments can undermine the reliability of preference rankings (Saaty et al. 2012).

Cross-verification with software (SpiceLogic application)

To further enhance accuracy, all AHP computations (Eigen values, weights, CR values) were verified through the SpiceLogic Decision Maker software. The software's built-in algorithms ensured that large datasets were processed efficiently and without computational error. Validation through software tools is recommended in multi-criteria decision-making studies, as it

reduces risks of manual miscalculation and strengthens methodological transparency (Kallas et al. 2009).

Triangulation of methods

Beyond numerical verification, results were compared with descriptive statistics (e.g., frequency of responses on taste preferences) to check for logical alignment between raw sensory evaluations and AHP-generated rankings. Triangulation improves validity by cross-checking findings across different analytical approaches (Flick 2018).

Regular monitoring during data collection

During data collection at night markets and retail points, field supervisors monitored the process to ensure that respondents completed the questionnaires independently and without external influence. Such monitoring helps to reduce response bias and maintain data integrity in survey research (Bryman 2016). Taken together, these quality control measures ensured that the data collected were reliable, internally consistent and free from major methodological flaws. They enhanced the validity and replicability of the research findings, providing confidence that the results accurately reflected consumer preferences for taufu-fa variants.

Role of SpiceLogic application

The SpiceLogic AHP software was utilised in this study as a dedicated tool to operationalise the Analytic Hierarchy Process (AHP) model efficiently (*Figure 3*). AHP is known to involve complex computational steps such as constructing pairwise comparison matrices, deriving eigenvectors and calculating consistency ratios (Saaty 1980; Saaty et al. 2012). While these calculations can be conducted manually or through generic software like Microsoft Excel, the process is often time-consuming and prone to human error. SpiceLogic was therefore selected for its capability to streamline data handling, computation and visualization of AHP results (Kallas et al. 2009).

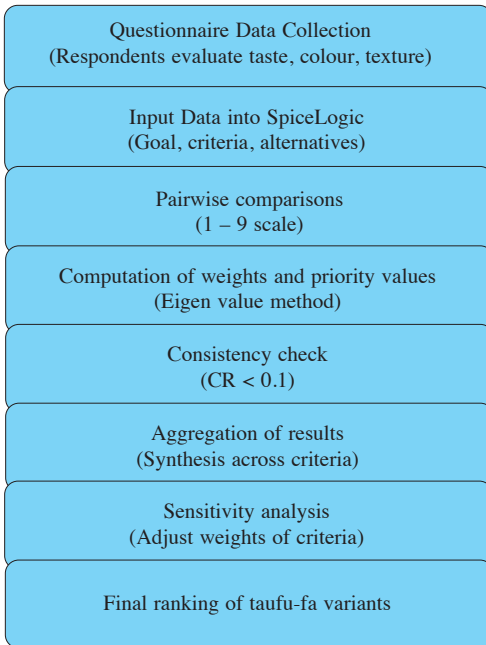


Figure 3. Flowchart of AHP analysis using SpiceLogic

Specifically, the software facilitated the hierarchical structuring of the decision-making model by allowing researchers to input the goal, criteria and alternatives in a tree-like format. This hierarchical setup ensured clarity and traceability of decision logic, which is crucial in consumer preference studies (Brans et al. 2005). The software also enabled pairwise comparisons to be entered directly, automatically applying Saaty's fundamental 1 – 9 scale to compute relative importance between criteria and alternatives. This automation ensured mathematical consistency in judgment, an aspect critical for validity in multi-criteria decision-making (Bui 1986).

Another important function of SpiceLogic was its ability to calculate consistency ratios (CR) instantly. In AHP, a CR below 0.1 indicates that the comparisons are logically consistent and reliable (Saaty et al. 2012). By embedding this function, the software helped the researchers identify and filter out inconsistent responses, thereby strengthening the quality and reliability of

the data. This feature is particularly useful in consumer research where respondents' subjective judgments may vary widely (Cicia et al. 2010).

The application also provided an integrated platform for sensitivity analysis, which allowed researchers to adjust the weightings of criteria such as taste, colour and texture to observe potential shifts in preference rankings. Sensitivity analysis is considered a key step in validating AHP results as it tests the robustness of the decision-making outcomes under different weighting scenarios (Brans et al. 2005). By leveraging SpiceLogic, this process was simplified and presented visually, enabling clearer interpretation of findings.

Furthermore, SpiceLogic supported data export in tabular and graphical formats, which enhanced the presentation of results for both academic and practical stakeholders. This feature allowed the researchers to include tables of priority values and preference rankings, as well as visual charts that improved the comprehensibility of the study's findings (Kallas et al. 2009).

In conclusion, the adoption of the SpiceLogic AHP application provided significant advantages for this research. It ensured computational accuracy, reduced the risk of human error and offered user-friendly interfaces for both data entry and output visualisation. By integrating AHP with SpiceLogic, the study was able to produce more transparent, replicable and robust insights into consumer preferences for taufu-fa, aligning with the growing need for decision-support tools in food preference research (Fei Tan et al. 2020).

Results

Demographic analysis of respondents

As in Table 1, a total of 150 respondents participated in this study, representing a diverse group of consumers with varying backgrounds and levels of familiarity with taufu-fa. In terms of gender distribution, the sample consisted of 58% female and 42% male respondents, indicating a

slightly higher participation from women. The respondents' ages ranged between 18 and 65 years, with the largest proportion (45%) belonging to the 26 – 40 age group, suggesting that taufu-fa is particularly popular among young and middle-aged adults.

From the perspective of residency, 62% of the participants were local residents of Melaka, while the remaining 38% were visitors. This composition ensured that the findings captured insights not only from regular local consumers but also from occasional buyers such as tourists or non-local visitors. In terms of consumption frequency, 45% of the respondents reported having consumed taufu-fa more than five times, reflecting a strong level of product familiarity and loyalty. This group provided valuable insights into established consumer preferences, while the remaining 55%, consisting of less frequent consumers, contributed perspectives that are important for understanding potential market expansion.

Table 1. Demographic profile of respondents

Variable	Category	Percentage (%)
Gender	Female	58
	Male	42
Age group	18 – 25	28
	26 – 40	45
	41 – 65	27
Residency	Local	62
	Visitor	38
Consumption	> 5 times	45
	< 5 times	55

AHP analysis

The application of the Analytic Hierarchy Process (AHP) in this study enabled a systematic evaluation of three primary sensory attributes, namely taste, colour and texture, which are critical in shaping consumer preferences towards taufu-fa (Figure 4). Pairwise comparison matrices were constructed for each attribute and the

relative importance of these attributes was computed using the eigen value method, ensuring that subjective sensory evaluations could be translated into quantifiable priority weights. To validate the reliability of the respondents' judgments, the consistency ratio (CR) was calculated and all matrices recorded values below 0.1, indicating that the comparisons were consistent and statistically acceptable. The analysis revealed that taste emerged as the most dominant attribute, carrying the highest relative weight of 0.45, which highlights its significant role in consumer decision-making. This was followed by colour with a weight of 0.28 and texture with a slightly lower weight of 0.27. These findings reinforce the importance of flavour as the leading factor influencing customer choices, while visual appeal and mouthfeel also contributed meaningfully, albeit to a lesser extent, in determining overall consumer preference.

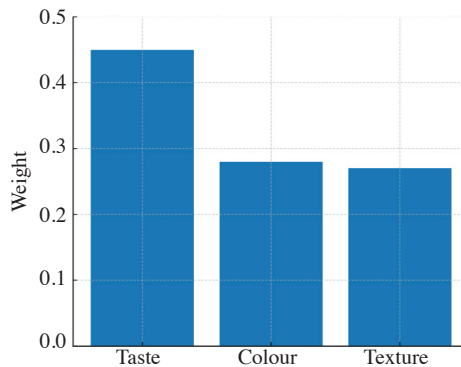


Figure 4. Ranking of sensory attributes (criteria weights)

Ranking of the criteria

Based on the Analytic Hierarchy Process (AHP) calculations, the ranking of sensory attributes demonstrates that taste is the most influential factor in shaping consumer preferences for taufu-fa (Table 2). With a weight of 0.45, taste accounts for nearly half of the overall decision-making process, highlighting its dominant role in determining customer satisfaction and

choice. This finding aligns with previous studies which emphasised that flavour is the primary driver of food preference and repeat purchase intention. The second most important attribute is colour, with a weight of 0.28. Consumers often associate appealing and natural colours with freshness, quality and authenticity, making colour an important determinant of visual appeal prior to tasting. Finally, texture holds a weight of 0.27, slightly lower than colour, but still significant in influencing consumer perceptions. A smooth, creamy texture enhances the indulgence and overall eating experience of taufu-fa. Collectively, the ranking of the criteria—taste, colour and texture illustrates that while taste is the decisive factor, both colour and texture remain important complementary attributes that contribute to the holistic sensory evaluation of the dessert. Based on AHP calculations, the ranking of sensory attributes is as follows:

Table 2. Ranking of sensory attributes

Criterion	Weight	Rank
Taste	0.45	1
Colour	0.28	2
Texture	0.27	3

Ranking of the alternatives

Each taufu-fa variant *gula kabung*, plain and corn-flavoured—was evaluated against the three main sensory criteria: taste, colour and texture. The Analytic Hierarchy Process (AHP) results revealed that the *gula kabung* variant consistently achieved the highest scores across all criteria, recording a priority value of 0.42 for taste, 0.48 for colour and 0.45 for texture (Table 3). This dominance placed *gula kabung* as the most preferred alternative with an overall priority score of 0.43. The Plain variant ranked second, showing moderate and balanced scores with 0.31 for taste, 0.35 for colour and 0.38 for texture, giving it an overall score of 0.32. Meanwhile, the corn-flavoured variant was the least preferred, with relatively low scores

of 0.27 for taste, 0.17 for colour and 0.17 for texture, resulting in an overall score of just 0.25. These findings clearly demonstrate that *gula kabung* not only dominated the taste factor—the most decisive attribute—but also excelled in colour and texture, establishing it as the most consistent and robust choice among consumers compared to the other alternatives.

Table 3. AHP results for taufu-fa variants (by criterion)

Variant	Taste (0.45)	Colour (0.28)	Texture (0.27)	Overall priority
<i>Gula kabung</i>	0.42	0.48	0.45	0.43
Plain	0.31	0.35	0.38	0.32
Corn-flavoured	0.27	0.17	0.17	0.25

Identification of the most preferred variant

The analysis clearly revealed that the *gula kabung* taufu-fa was identified as the most preferred variant across all sensory criteria evaluated in this study (Figure 5). In terms of taste, the *gula kabung* variant received the highest priority value of 0.42, attributed to its strong caramel-like sweetness that resonated well with consumer expectations of authenticity and indulgence. For colour, this variant also stood out with a priority value of 0.48, as its natural golden-brown hue was perceived to be visually appealing and appetising compared to the paler alternatives. Likewise, for texture, the *gula kabung* taufu-fa achieved the top score of 0.45, with respondents particularly appreciating its smooth consistency combined with a slightly caramelised finish that enhanced the overall eating experience. Taken together, these findings confirm that the *gula kabung* variant consistently outperformed the plain and corn-flavoured alternatives, establishing itself as the strongest candidate for market positioning and product development strategies.

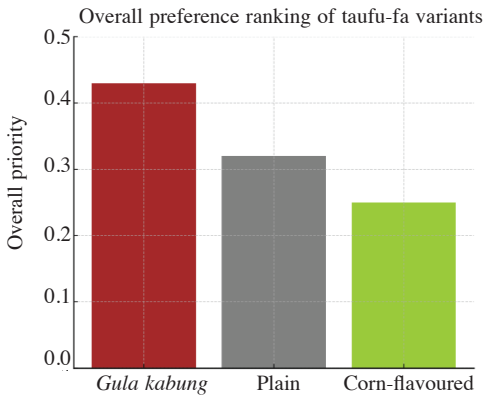


Figure 5. Overall preference ranking of taufu-fa variants

Discussion

Sensory attributes and consumer decision-making

The results clearly demonstrate that taste is the dominant factor influencing consumer preference for taufu-fa. With a decision weight of 0.45 in the AHP model, this attribute accounted for nearly half of the overall decision-making process. The bar chart (Figure 6) shows that the *gula kabung* variant achieved the highest overall priority value (0.43), compared to plain (0.32) and corn-flavoured (0.25).

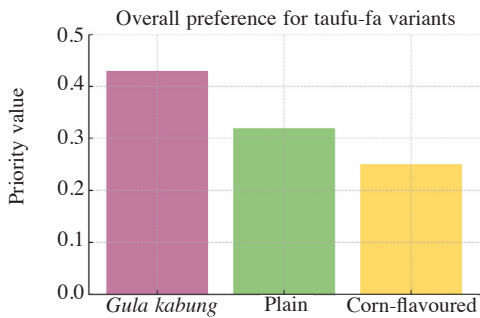


Figure 6. Overall preference for taufu-fa variants

Additionally, the pie charts (Figures 7 – 9) illustrate the dominance of *gula kabung* across all sensory attributes: taste (42%), colour (48%) and texture (45%). Its caramelised flavour, golden-brown hue and smooth texture made it the most appealing choice.

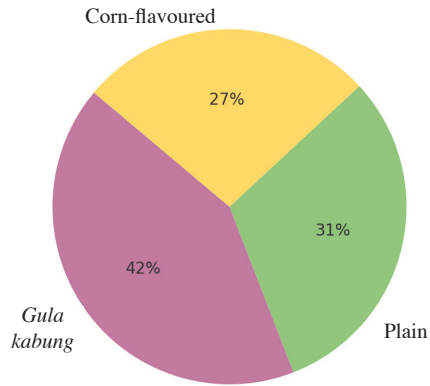


Figure 7. Taste preference distribution

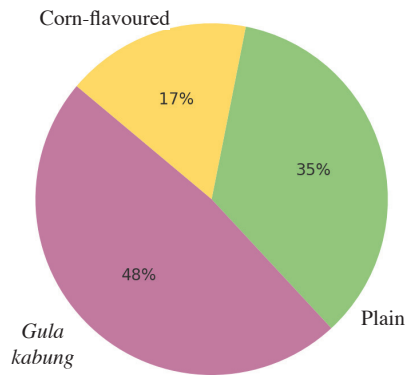


Figure 8. Colour preference distribution

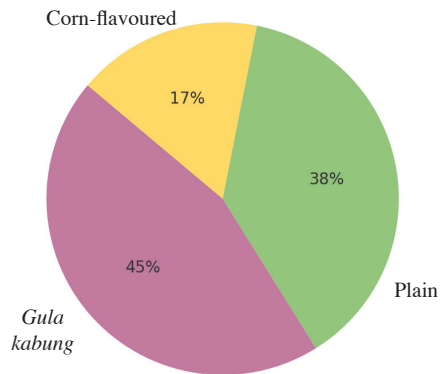


Figure 9. Texture preference distribution

Market implications

The dominance of the *gula kabung* variant reflects a broader consumer trend that increasingly values authenticity, tradition, and cultural heritage in food consumption. Recent studies have highlighted that modern consumers are not only motivated by sensory attributes but also by the symbolic meanings embedded in traditional foods, such as cultural identity, nostalgia and perceived naturalness (Muh. Zulkifli Murfat et al. 2023; Fei Tan et al. 2020). The pie charts presented in this study reinforce this preference by showing consistently higher scores for *gula kabung* across taste (42%), colour (48%) and texture (45%), underscoring its appeal as a flavour that resonates with both sensory satisfaction and cultural significance.

For entrepreneurs, these findings imply that strategically positioning *gula kabung* as a flagship product offers significant potential for market penetration and brand differentiation. Previous consumer research suggests that authentic flavours tied to local traditions often foster stronger brand loyalty, as they align with consumer expectations of “heritage value” and perceived health benefits from natural ingredients (Cicia et al. 2010; Uyeda et al. 2016). Moreover, the golden-brown hue and smooth texture of the *gula kabung* variant enhance its premium positioning by visually and experientially distinguishing it from plainer or experimental alternatives.

From a commercial perspective, the plain variant may continue to serve as a secondary product, catering to consumers who prefer simplicity or are health-conscious, as its neutral flavour profile allows for broader appeal. Meanwhile, the corn-flavoured variant, which consistently received the lowest preference ratings across attributes, may require niche targeting strategies. For example, younger consumers or tourists who are more open to innovation could be targeted with creative marketing campaigns that frame corn-flavoured *taufu-fa* as a modern reinterpretation of

tradition, thus tapping into novelty-seeking behaviours (Kallas et al. 2009).

Furthermore, market segmentation based on demographic analysis (e.g., age, gender, locality) should be leveraged. For instance, older consumers and local residents showed higher loyalty to *gula kabung*, indicating that marketing messages for these groups should emphasise tradition, nostalgia and authenticity. Conversely, younger and visiting consumers, while still showing preference for *gula kabung*, could be more receptive to innovative variants, especially when marketed through digital and experiential platforms that resonate with their lifestyle choices (Brans et al. 2005; Saaty et al. 2012).

In summary, the market implications of this study point toward a dual strategy: consolidating *gula kabung* as the flagship product to strengthen brand identity and consumer loyalty, while selectively innovating with secondary variants to attract niche segments. This aligns with contemporary research which emphasises that businesses in the traditional food sector must balance authenticity with innovation to remain competitive in evolving markets (Muh. Zulkifli Murfat et al. 2023; Eka Rachma Kurniasi et al. 2021).

Product development strategies

The findings suggest several key product development strategies that can enhance the market potential of *taufu-fa*. As in *Figure 10*, producers should focus production on the *gula kabung* variant, as it consistently outperformed the other options in terms of taste, colour and texture (Cicia et al. 2010). Ensuring quality assurance through sensory consistency is also vital, since consumers are more likely to develop loyalty when flavour, texture and visual appeal remain reliable across purchases (Fei Tan et al. 2020). At the same time, packaging innovation should be prioritised by combining traditional cultural elements with modern eco-friendly designs, thereby strengthening both authenticity and

environmental appeal (Muh. Zulkifli Murfat et al. 2023). In addition, market positioning strategies can elevate *gula kabung* taufu-fa into a premium heritage dessert, reflecting the growing consumer demand for authentic and traditional food products (Uyeda et al. 2016). Finally, establishing a customer feedback loop through surveys and online reviews would allow entrepreneurs to adapt quickly to evolving consumer expectations, ensuring long-term competitiveness and sustainability (Kallas et al. 2009).

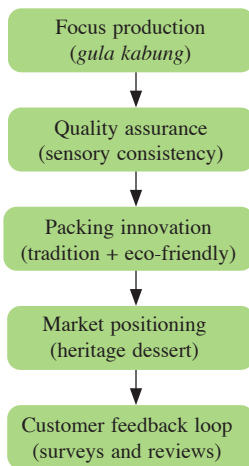


Figure 10. Proposed product development strategies

Demographic insights and segmentation

The stacked bar chart (Figure 11) highlights meaningful demographic variations in consumer preferences for taufu-fa, underscoring the need for targeted market segmentation strategies. Female respondents demonstrated a stronger inclination towards the *gula kabung* variant (46%) compared to males (40%). This finding aligns with studies suggesting that women often place higher value on natural sweetness and perceived health benefits when selecting food products (Fei Tan et al. 2020). For marketers, this indicates the potential effectiveness of positioning *gula kabung* taufu-fa as a dessert that is both indulgent and naturally wholesome, thereby appealing to female consumers who are increasingly health-conscious.

In addition, local residents showed a stronger preference for traditional flavours (55%) relative to visitors (48%). This pattern supports prior findings that local consumers are more likely to associate traditional desserts with cultural authenticity and emotional nostalgia (Muh. Zulkifli Murfat et al. 2023). By contrast, visitors may approach such desserts with curiosity rather than cultural attachment, making them more open to experimenting with innovative or fusion flavours. This distinction suggests that local markets may be more responsive to campaigns highlighting heritage and tradition, while visitor-focused strategies could emphasise novelty, tourism experiences and modern reinterpretations of local delicacies.

Age also emerged as a differentiating factor. Respondents aged 40 and above displayed stronger loyalty to the *gula kabung* variant (52%) compared to younger consumers (43%). Previous studies have indicated that older consumers tend to prioritise familiarity, cultural continuity and authenticity in their food choices (Cicia et al. 2010; Uyeda et al. 2016). Younger consumers, by contrast, are generally more experimental and influenced by contemporary food trends, including fusion products and visually appealing packaging (Kallas et al. 2009). This suggests that while *gula kabung* retains its stronghold among older demographics, there is room to introduce creative product innovations aimed at younger markets, such as seasonal limited-edition flavours or digital marketing campaigns leveraging social media platforms.

Taken together, these demographic variations emphasise that a “one-size-fits-all” approach would be inadequate. Instead, tailored segmentation strategies are essential:

- Female consumers: highlight natural ingredients and health benefits.
- Local residents and older age groups: focus on authenticity, tradition and cultural identity.

- Visitors and younger consumers: introduce innovative flavours and modern packaging to capture their openness to experimentation.

By integrating demographic insights into product positioning, entrepreneurs can ensure that taufu-fa products not only resonate with diverse consumer groups but also sustain competitiveness in both traditional and evolving markets.

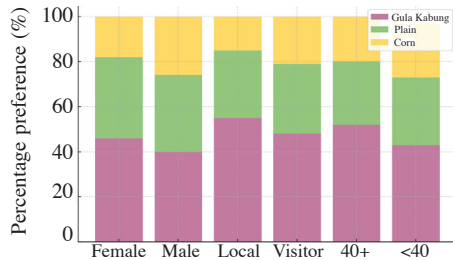


Figure 11. Demographic preferences for taufu-fa variants

Limitations and future research

While this study provides meaningful insights into consumer preferences for taufu-fa, certain limitations must be acknowledged. The relatively small sample size of 150 respondents, restricted to Melaka, may limit the generalisability of the findings to other regions in Malaysia (Department of Statistics Malaysia, 2021). In addition, the analysis focused solely on three sensory attributes—taste, colour and texture—without considering other important factors such as price sensitivity, packaging appeal, health perceptions and brand image, all of which have been highlighted in previous food preference studies as significant determinants of consumer choice (Uyeda et al. 2016; Fei Tan et al. 2020).

Future research should therefore aim to expand the sample size and geographical coverage to better capture regional variations in consumer behaviour. Additional criteria such as affordability, packaging innovation and nutritional value should also be incorporated, as these are increasingly relevant in shaping modern

food consumption (Muh. Zulkifli Murfat et al. 2023). Furthermore, psychological and cultural drivers—including nostalgia and heritage pride should be explored to understand deeper motivations behind traditional dessert consumption (Cicia et al. 2010). Longitudinal studies would also provide valuable insights into how preferences evolve over time in response to shifting food trends and lifestyles (Kallas et al. 2009).

In conclusion, the findings reaffirm *gula kabung* as the dominant consumer choice across all sensory attributes and demographic groups. The inclusion of visual tools such as bar charts, pie charts, stacked bar charts and a strategic flowchart further strengthens the validity of the results. This study ultimately demonstrates that sensory attributes, when combined with cultural authenticity, are key drivers of consumer preference, offering small-scale entrepreneurs' actionable strategies to align their products with market demand and ensure sustainable growth (Saaty 1980; Eka Rachma Kurniasi et al. 2021).

Conclusion

This study applied the Analytic Hierarchy Process (AHP) to evaluate consumer preferences for three taufu-fa variants—*gula kabung*, plain and corn-flavoured—based on taste, colour and texture. The findings revealed that *gula kabung* is the most preferred variant, with taste emerging as the dominant factor. These results underscore the significance of authentic and culturally rooted flavours in shaping consumer choices, particularly within the context of traditional Malaysian desserts.

From a practical perspective, the study provides actionable insights for small-scale producers and entrepreneurs. By prioritising *gula kabung* as a flagship product, businesses can align more effectively with consumer demand. Consistency in sensory quality, coupled with innovative and culturally appealing marketing strategies,

is essential to enhance competitiveness and foster customer loyalty in the evolving food market.

Despite its contributions, the study is limited by its sample size and regional focus. Nevertheless, it demonstrates the utility of AHP in capturing sensory preferences and highlights its potential for broader applications in food studies. Future research should incorporate wider demographics and additional decision-making criteria such as pricing, packaging, health perceptions and branding to provide a more comprehensive understanding of consumer behaviour.

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Abstrak

Kajian ini meniasat keutamaan pengguna terhadap taufu-fa iaitu pencuci mulut tradisional Malaysia yang diperbuat daripada tauhu lembut untuk memberikan pandangan empirikal yang boleh membimbing pembangunan produk dan strategi pemasaran. Mengenal pasti keutamaan ini adalah penting, kerana pilihan makanan pengguna sebahagian besarnya dibentuk oleh atribut deria dan nilai budaya. Reka bentuk penyelidikan kuantitatif telah diterima pakai menggunakan Proses Hierarki Analitik (AHP) yang dilaksanakan melalui aplikasi SpiceLogic. Seramai 150 responden di Melaka telah dikaji melalui soal selidik berstruktur. Tiga sifat deria utama, rasa, warna dan tekstur telah dinilai. Perbandingan berpasangan dan pengiraan nilai Eigen digunakan untuk menjana nilai keutamaan, manakala nisbah ketekalan ($CR < 0.1$) memastikan pertimbangan yang boleh dipercayai. Analisis mendedahkan bahawa rasa adalah atribut yang paling berpengaruh (berat = 0.45), diikuti oleh warna (0.28) dan tekstur (0.27). Antara ketiga-tiga varian tersebut, gula kabung taufu-fa menduduki tempat tertinggi dengan nilai keutamaan keseluruhan 0.43, diikuti dengan perisa biasa (0.32) dan jagung (0.25). Secara khusus, gula kabung mendapat markah 0.42 untuk rasa, 0.48 untuk warna dan 0.45 untuk tekstur, secara konsisten mengatasi dua varian yang lain. Analisis sensitiviti mengesahkan kestabilan keputusan ini merentas senario pemberat yang berbeza. Walaupun terhad oleh saiz sampel dan skop geografi, penemuan menunjukkan potensi gula kabung taufu-fa sebagai produk utama dalam pasaran pencuci mulut tradisional. Penyelidikan masa depan harus berkembang kepada populasi yang lebih besar dan lebih pelbagai dan termasuk faktor tambahan seperti harga, pembungkusan dan persepsi pemakanan.