CONSUMER PERCEPTION AND DEVELOPMENT OF MALAYSIAN *KUIH BAKAR* PREMIX PRODUCTS

By

NAILI BINTI NAHAR

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

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DEDICATION

This thesis is dedicated to the precious people in my life.

Not to forget those who were affected by the pandemic Covid-19 in the year 2020, 2021 and 2022. Life was hard, but we all survived and come back stronger and even more persistent. Alhamdulillah (Thank you God).

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

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By

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August 2024

Chairman : Professor Muhd. Shahrim bin Ab Karim, PhD
Faculty : Food Science and Technology

Heritage foods, which symbolise the gastronomic habits and customs passed down through the ages, are an essential part of cultural heritage. *Kuih bakar* is listed as one of the intangible cultural heritages by the Department of National Heritage Malaysia. *Kuih bakar* is one of the most revered heritage foods by Malaysians due to its delicious taste and aroma. Therefore, *kuih bakar* is chosen as the main subject of this research due to its popularity, signified by its apparent market potential. Although *kuih bakar* is well-liked, the raw materials are hard to obtain, and ingredient preparation is too tedious and difficult to make. The complexity of making heritage foods has hindered people from making *kuih bakar*, possibly leading to the extinction of heritage foods in the future. In order to reduce the complexity of producing heritage food, especially *kuih bakar*, a new product development idea, which is the *kuih bakar* premix, has been created. The main aim of this research is to explore idea generation from consumers regarding the premix development of Malaysian heritage food, *kuih bakar*, via an interdisciplinary approach involving social

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science and science technology studies. A total of 62 consumers (n = 62) were successfully recruited for six focus group discussions (FGD). Next, six experts (n = 6) in *kuih bakar* making were interviewed to discover the challenges of making *kuih bakar* from scratch. The experts were the *kuih bakar* producers, who sold *kuih bakar* daily for a living. Lastly, all the data gathered through the qualitative data collection methods above were transferred into the laboratory for the development of the *kuih bakar* premix. The researcher applied response surface methodology (RSM) for optimising the *kuih bakar* premix formulation, which is part of the design of the experiment (DOE). The researcher has conducted the DOE with the ingredients for the premix as the independent variables (factors) and consumer sensory preference and acceptability tests as the dependent variables (responses). The sensory evaluation sessions were conducted with 52 panellists (n = 52). Based on the optimisation graphs, the ideal concentrations of sugar and coconut milk powder to produce *kuih bakar* premix with the desired sensory attributes were 102.28% and 36.11%, respectively, based on the baker's percentage. This research contributes to the development of the *kuih bakar* premix specifically by delivering input from consumers, guaranteeing that it satisfies contemporary tastes, cultural authenticity, and sensory expectations. This study aids in creating a product that appeals to the intended market. It is hoped that *kuih bakar* premix could help citizens, such as working mothers, busy adults, and young generations, to prepare heritage foods at home. Not only that, heritage food producers could also benefit from the *kuih bakar* premix due to its convenience and feasibility.

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Keywords: consumer study, heritage food, *kuih bakar*, product development, sensory study

SDG: GOAL 9: Industry, Innovation and Infrastructure

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Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

PERSEPSI PENGGUNA DAN PEMBANGUNAN PRODUK TEPUNG PRA-CAMPUR KUIH BAKAR MALAYSIA

Oleh

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Makanan warisan melambangkan tabiat gastronomi dan adat yang diturunkan dari zaman ke zaman. Kuih bakar disenaraikan sebagai salah satu warisan budaya tidak ketara oleh Jabatan Warisan Negara Malaysia. Kuih bakar merupakan antara makanan warisan yang paling digemari oleh rakyat Malaysia kerana rasa dan aromanya yang enak. Oleh itu, kuih bakar dipilih sebagai subjek utama kajian ini kerana popularitinya yang menunjukkan potensi pasarannya. Walaupun kuih bakar digemari ramai, bahan mentahnya sukar diperoleh, dan penyediaan bahannya terlalu rumit dan sukar untuk dibuat. Kerumitan membuat makanan warisan telah menghalang orang ramai daripada membuat kuih bakar, yang boleh membawa kepada kepupusan makanan warisan pada masa hadapan. Bagi mengurangkan kerumitan penghasilan makanan warisan terutamanya kuih bakar, satu idea pembangunan produk baharu iaitu tepung pra-campur kuih bakar dicipta. Tujuan utama penyelidikan ini adalah untuk meneroka penjanaan idea dari bakal pengguna mengenai pembuatan tepung pra-campur makanan warisan

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Malaysia iaitu kuih bakar melalui pendekatan ‘interdisciplinary’ yang melibatkan kajian sains sosial dan sains teknologi. Sebanyak 62 pengguna (n = 62) mengambil bahagian dalam enam sesi perbincangan kumpulan berfokus. Selanjutnya, enam pakar (n = 6) dalam pembuatan kuih bakar diwawancara untuk mengetahui cabaran dalam membuat kuih bakar secara konvensional. Pakarnya adalah penjual kuih bakar yang menjual kuih bakar setiap hari untuk kelangsungan bisnes mereka. Akhir sekali, dengan semua data yang dikumpulkan melalui kaedah pengumpulan data kualitatif di atas, data tersebut dipindahkan ke makmal untuk pembangunan tepung pra-campur bagi kuih bakar. Pengkaji menggunakan metodologi permukaan tindak balas (RSM) untuk pengoptimuman formulasi tepung segera bagi kuih bakar, yang merupakan sebahagian daripada reka bentuk eksperimen (DOE). Pengkaji telah menjalankan DOE dengan ramuan untuk tepung segera sebagai pembolehubah tidak bersandar (faktor) dan ujian penerimaan deria pengguna sebagai pembolehubah bersandar (tindak balas). Sesi penilaian deria telah dijalankan dengan 52 ahli panel (n = 52). Berdasarkan pengoptimuman, kepekatan ideal gula dan serbuk santan untuk menghasilkan tepung pra-campur kuih bakar dengan sifat sensori yang dikehendaki ialah masing-masing 102.28% dan 36.11% bagi gula dan serbuk santan mengikut kiraan formula ‘baker’s percentage’. Penyelidikan ini menyumbang kepada pembangunan tepung pra-campur kuih bakar secara khusus dengan menyampaikan input daripada pelanggan, menjamin ia memenuhi cita rasa kontemporari, keaslian budaya, dan jangkaan deria. Ini membantu mencipta produk yang menarik kepada pasaran makanan tradisional. Tepung pra-campur kuih bakar diharap dapat membantu masyarakat seperti ibu bekerja

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dan generasi muda untuk menyediakan makanan warisan di rumah. Bukan itu sahaja, pengeluar makanan warisan juga boleh mendapat manfaat daripada tepung pra-campur kuih bakar kerana kemudahan dan kebolehlaksanaannya.

Kata Kunci: kajian deria, kajian pengguna, kuih bakar, makanan warisan, pembangunan produk

SDG: MATLAMAT 9: Industri, Inovasi dan Infrastruktur

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LIST OF ABBREVIATIONS

NPD	New Product Development
FGD	Focus Group Discussion
R&D	Research and Development
VoC	Voice of Customer
RTE	Ready-to-eat
RM	Ringgit Malaysia
RSM	Response Surface Methodology
DOE	Design of Experiment
CCD	Central Composite Design
^{0}C	degree Celsius

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CHAPTER 1

INTRODUCTION

1.1 Background of Study

Traditional foods have a big role in the cultural history and national character of a country. These foods serve as both a source of nourishment and a window into the culture, values, and traditions of a specific society. For years, Malaysians have valued traditional foods like *kuih bakar*, which symbolise the rich gastronomic diversity of the nation. The popularity of Malaysian heritage food is declining as the world is evolving. Food heritage is a culture and an identity of a country (Ling et al., 2010). Popular Malaysian delicacy *kuih bakar* is created with wheat flour, coconut milk, sugar, *pandan* and sesame seeds (Sharifah et al., 2015). It has long been a standard in Malaysian homes and is frequently consumed during important events, festivals, and social gatherings.

According to de Barcellos et al. (2009), consumers identified cultural and ethnic foods as innovations despite the fact that these are actually food categories rather than innovative food products. Nonetheless, a product is considered to be an innovation if it is perceived as new by an individual or other unit of adoption. There are different degrees and types of innovations, all consisting of a change compared to existing products, but offering considerable variation in the level of change. Innovations can follow a company's perspective which is newness to the company and technological newness or a consumer's perspective such as market newness and consumer's benefit newness (de Barcellos et al., 2009). New products are

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responsible for employment, economic growth, technological progress, and high standards of living. Therefore, the study of food innovation and the processes through which they emerge is important (Bhuiyan, 2011).

The goal of this study is to close the gap between consumer expectations and the developed *kuih bakar* premix formulations. This study seeks to develop a consumer-led food product development strategy to optimise the premix formulation of *kuih bakar* by using an exploration and experimental study methods. In order to systematically investigate and optimise the combination of ingredients and their proportions in the premix formulation, taking into account sensory attributes and overall product quality, the research intends to apply the principles of Response Surface Methodology (RSM).

The motive of this research is to better match *kuih bakar* premix formulations with the preferences of contemporary customers while keeping preserving the cultural and traditional character of the *kuih* in order to increase its acceptance and marketability. This study aims to contribute to the restoration of *kuih bakar* as a beloved and significant component of Malaysian culinary history by fusing scientific rigour, cultural understanding, and consumer insights. According to Hellali and Korai (2023), by examining consumer insights, tastes, and motives, organisations can get significant understandings that help them develop strategies and decisions that will appeal to their target market.

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1.2 Problem Statements

Heritage foods, which symbolise the gastronomic habits and customs passed down through the ages, are an essential part of cultural heritage (Lee, 2023). New product development knowledge could help in improving heritage food to a higher level in food industries. Premix is an emerging method of food preparation in the world where most of the people nowadays are busy and they do not have much time to prepare food at home (Basak et al., 2023).

Kuih bakar is listed as one of the intangible cultural heritages by the Department of National Heritage Malaysia. Other heritage foods that are listed by this department are *nasi lemak, wajik, sata, dodol, pulut panggang, kuih seri muka, tapai, karipap, keropok lekor, seri kaya, kuih bakul and putu mayam* (Department of National Heritage Malaysia, 2020). According to Sharifah et al. (2015), *kuih bakar* is one of the most liked heritage foods by the Malaysians due to its delicious taste and aroma. Therefore, *kuih bakar* is choose as the main subject of this research due to its popularity which signify its apparent market potential. Although *kuih bakar* is well-liked, the raw materials are hard to obtain, and ingredient preparation is too tedious and difficult to make (Maimanah-Faizah et al., 2020). Research conducted by Hamzah et al. (2015), discovered that youths and their parents are busy, and they did not have much time to prepare foods at home, especially Malay traditional *kuih*. Generally, preparation of traditional Malay *kuih* is time consuming and difficult. They prefer to eat food that can be prepared quickly at home or eating out at fast-food restaurants (Kamaruzaman et al., 2020). These mean that the

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complexity of making heritage foods has hindered people from making *kuih bakar*, which could lead to the extinction of heritage foods in the future.

In order to reduce the complexity of producing heritage food especially *kuih bakar*, a new product development idea which is *kuih bakar* premix is created. Therefore, the main aim of this research is to produce a consumer-led premix formulation of Malaysian heritage food *kuih bakar* by exploring the consumer preferences, expectations and opinions of *kuih bakar* premix. Understanding consumers are very important in any businesses, because consumers are the one who drives the business success (Cooper & Sommer, 2018). In order to create a successful product, it is important to discover the challenges in making *kuih bakar* based on producers' experiences and their opinions regarding *kuih bakar* premix. This is because, by discovering these challenges, a product which helps to ease the consumers including producers will be created. Lastly the data gathered above will be used to develop the optimum formulation for *kuih bakar* premix using response surface methodology.

It is hoped that *kuih bakar* premix could help citizens, such as working mothers, busy adults, and young generations to prepare the heritage foods at home. Not only that, heritage food producers could also benefit from the *kuih bakar* premix due to its convenience and feasibility. It is hoped that with the development of *kuih bakar* premix, the image and identity of heritage foods could be sustained in the future. Policymakers and food industry practitioners

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could use the data provided in this thesis to enhance the existence of heritage foods.

1.3 Research Questions

i. What are the consumer preferences, expectations and opinions of *kuih bakar* premix?

ii. What are the challenges in making *kuih bakar* based on producers' experiences and their opinions regarding *kuih bakar* premix?

iii. What is the optimised formulation for *kuih bakar* premix?

1.4 Objectives

The main aim of this research is to produce a consumer-led premix formulation of Malaysian heritage food *kuih bakar* and the specific objectives were:

i. To explore the consumer preferences, expectations and opinions of *kuih bakar* premix.

ii. To discover the challenges in making *kuih bakar* based on producers' experiences and their opinions regarding *kuih bakar* premix.

iii. To develop the optimum formulation for *kuih bakar* premix using response surface methodology.

1.5 Scope of Study

In order to overcome the difficulties involved in making *kuih bakar*, a traditional Malaysian heritage dish, this study focusses on creating a *kuih bakar* premix product. As a component of Malaysia's intangible cultural heritage, *kuih bakar* is cherished for its rich flavour and scent. However, its accessibility has

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become limited, especially for contemporary consumers, by the difficulty of procuring raw materials and the intricacy of preparation. Through the development of a practical premix product, this study aims to simplifies the preparation procedure while maintaining the cultural and sensory authenticity of *kuih bakar*.

The scope entails getting opinions from a range of stakeholders, such as professionals and customers. Focus groups were held with 62 customers in order to get information about their *kuih bakar* premix preferences, expectations, and difficulties. To determine the challenges associated with traditional preparation, six *kuih bakar* producers who make and sell *kuih bakar* on a daily basis were also interviewed. Understanding customer wants and improving the product's development were made possible by this qualitative data.

The *kuih bakar* premix formulation was optimised in the laboratory phase using response surface methodology (RSM), a statistical technique used in design of experiments (DOE). Important components like sugar and coconut milk powder were changed as independent variables, and information on customer preferences was obtained from 52 panellists' sensory assessments. The best formula was found to guarantee that the premix will satisfy modern palates while maintaining its identity as a heritage product.

This study focusses on product development and consumer acceptance rather than conducting more extensive comparison analyses with other heritage

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foods or commercial scaling methods. By providing a practical way to make *kuih bakar* at home, it is meant to help working mothers, busy adults, younger generations, and heritage food producers. This study aids in the preservation of Malaysia's culinary heritage by bridging the gap between tradition and contemporary convenience.

1.6 Significance of Study

There is very minimal information regarding innovative premixes on Malaysian heritage foods, especially *kuih bakar*. Therefore, this research addresses this gap, and the developed product has a very good potential to be the basis for other innovative studies. The exploration and experimental study of consumer-led food product development for premix formulation of Malaysian heritage food, *kuih bakar*, is significant from a variety of perspectives, including economic growth, cultural preservation, and culinary innovation. According to Omar et al. (2015), heritage food preservation is crucial to preserving cultural practises, passing down historical identities, and celebrating culinary diversity for future generations.

First and foremost, this study is of utmost significance for the protection of cultural heritage. *Kuih bakar* is more than just a typical *kuih*; it encapsulates countless years of Malaysian traditions, and common experiences. This research greatly contributes to preserving and renewing this essential aspect of Malaysia's cultural identity by developing an optimised premix formulation that captures the authentic flavours and cultural essence of *kuih bakar*. The results may help Malaysians rediscover their sense of belonging and pride

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while creating an appreciation for their past and encouraging cross-generational cultural transmission. A sense of national identity and pride is fostered through traditional food, which acts as a cultural emblem by representing the distinct heritage, values, and history of a nation (Ruby et al., 2023).

Another important aspect of the significance of this research is its impact on the culinary environment. The study lays the door for a harmonic fusion of tradition and modernity by using cutting-edge methods like Response Surface Methodology (RSM) to improve *kuih bakar's* premix composition. RSM has the advantage of efficiently examining many aspects and how they interact to get best results with the least amount of experimentation (Teshale et al., 2022). The ability for culinary traditions to change without losing authenticity is illustrated by the development of an updated *kuih bakar* that satisfies modern customer demands while maintaining its identity. By bridging the gap between traditional characteristics and contemporary culinary practises, this creative method might serve as an inspiration for additional experimentation and adaption of other classic recipes.

The research's influence also extends to economic development and empowerment, especially for small and medium-sized businesses (SMEs) involved in conventional food production. *Kuih bakar's* commercial viability could be increase through the creation of a marketable premix formulation, opening up new opportunities for revenue generating and market growth. This might enable local business owners and craftsmen to flourish in a cutthroat

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food market while retaining their cultural heritage. The ensuing economic advantages may help communities engaged in conventional food production become more prosperous overall by generating jobs and sustainable lives (Zheng, 2023).

Academically, this study advances the ways in which food science and technology researchers do their research. RSM is used to optimise premix formulation, and it gives a methodical and empirical technique that may be imitated in a variety of situations. This study serves as a guide for further research that aims to improve the quality and marketability of traditional foods using scientific optimisation methodologies, adding to the larger conversation on the creation of novel food products. According to Ruby et al. (2023), modern technology boosts the efficiency, quality, and safety of traditional food production while also permitting wider dissemination and protecting traditional taste and identity for future generations.

In conclusion, this research has broad implications for academic advancement, economic development, cultural preservation, and gastronomic innovation. This study not only revives a beloved heritage food but also establishes a precedent for the peaceful coexistence of tradition and modernity in culinary practises by addressing the difficulties faced by *kuih bakar* sellers. This research has the potential to have a significant, transformative impact on culture, business, academia, and other fields due to its interdisciplinary methods of social science and technological science.

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1.7 Research Scheme

This study's research methodology employs an interdisciplinary approach, integrating social science and science and technology to maximise the development of the *kuih bakar* premix product and obtain a thorough grasp of consumer preferences. Focus groups and expert interviews are used in the qualitative phase to learn more about the difficulties in making *kuih bakar* and the demands for a convenient premix solution. Based on sensory evaluation data, the science and technology phase statistically optimise the premix formulation using response surface methodology (RSM).

Two important groups comprise the study's population which are *kuih bakar* producers and consumers. In order to learn more about the preferences, difficulties, and expectations of sixty-two consumers (n = 62) with regard to *kuih bakar* premix, six focus groups were conducted. Six *kuih bakar* experts, who were experienced heritage food producers, were also interviewed in order to determine the difficulties involved in preparing traditional *kuih bakar*. To make sure the participants were significant to the study's goals, purposeful sampling was employed.

Both social science and science and technology methodologies were used in the data collection process. The premix production process was informed by insights gleaned from a thematic analysis of the qualitative data from focus group discussions and expert interviews. 52 panellists (n = 52) participated in sensory evaluation sessions during the science and technology phase. This is to rate the sensory qualities of different premix formulations. RSM, a statistical

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method that aids in optimising ingredient quantities to obtain the desired sensory qualities, was used to analyse the data from these sessions.

Several steps made up the research process which are utilising qualitative approaches to collect consumer and expert inputs, using DOE to formulate and test the *kuih bakar* premix in the laboratory; and using sensory assessment to optimised the formulation. This methodical process guarantees that the finished product maintains the cultural and sensory authenticity of *kuih bakar* while also satisfying the demands of modern consumers.

1.8 Chapter Summary

This chapter presents the background of study, problem statements, research questions, objectives, scope of study, significance of study and research scheme. It provides the overview of the study, and it also explains the justification to conduct this study.

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CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Based in Southeast Asia, Malaysia has several different ethnic groups that coexist peacefully and with respect for one another over its 330,000 square kilometres of land. Natural rainforests, wetlands, undeveloped islands with some of the most beautiful coral reefs and beaches in the world, rich flora and fauna that are home to numerous rare species of insects, birds, and animals, and that's not even mentioning the gastronomic heritage, which dates back many, many centuries, are all found throughout Malaysia (Withey, 2004).

The national dishes of Malaysia are passed down from ancestors and descendants. They were developed as a result of numerous evolutions. Malaysians enjoy adding coconut and chilli to their food. The majority of traditional cuisines use traditional ingredients such as rice, chicken, beef, prawns, fish, fruits, and glutinous flour (Arshad, 2000).

Malaysia, a vibrant and culturally varied country located in Southeast Asia, is renowned for its fascinating landscapes, rich history, and, most notably, its outstanding culinary legacy. Malaysia's food culture is a harmonious synthesis of customs, flavours, and culinary methods (Nor et al., 2012). The country's population is made up of a variety of ethnic groupings, including Malay, Chinese, Indian, and indigenous communities. A broad and diversified culinary environment has emerged as a result of the blending of these influences,

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showcasing the nation's cultural diversity through its cuisine (Zainal Abidin et al., 2020).

Malaysian food is well known for its ability to entice the palate with a variety of flavours, from the scorching heat of rendang to the fragrant seduction of nasi lemak. Each dish tells a tale that illustrates the history, migratory patterns, and regional specialties of the nation (Sharif et al., 2016). Beyond being excellent, Malaysian cuisine is an integral part of social events and festivals, helping to promote unity and a sense of shared identity. Because of this, discovering Malaysia's culinary pleasures is not only a feast for the senses but also a glimpse into the diverse cultural heritage that gives the country its unique identity (Raji et al., 2017).

Malaysia's cuisine is a gastronomic tapestry that brings together the strands of its history, ethnicity, and culture to create a tantalising and enthralling story. Malaysian cuisine is more than just food; with its variety of dishes that reflect the many influences of its multicultural culture, it is an embodiment of the country's identity and a tribute to its capacity to embrace many traditions while encouraging harmony (Omar et al., 2015). Malaysian cuisine serves as a common language that cuts across barriers and invites everyone to take part in the country's rich heritage, from lively street food markets to family get-togethers. Malaysia's culinary tradition endures, celebrating the nation's past, present, and future as the aroma of spices and the sizzle of woks continue to fill its kitchens and diners (Muhammad et al., 2013).

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2.2 Malaysian Heritage Food

Malaysian heritage foods embody centuries of cultural traditions, regional influences, and personal recollections, and they are the very essence of the nation's culinary identity. In addition to providing food, these traditional meals and cooking techniques serve as a tangible link to the past, a celebration of diversity, and a reminder of the common experiences of previous generations (Lee, 2023). Due to its distinctive geographic location, Malaysia has experienced a wide variety of culinary influences, fusing local products with tastes from traders, immigrants, and colonisers. Malaysian cuisine has a diverse range of tastes, scents, and textures that represent the country's multi-ethnic population (Abidin et al., 2022).

Each traditional meal, from the flavourful nasi lemak to the fragrant and spicy rendang, tells a tale about its ancestry and the individuals who helped shape it. In order to preserve both the cooking methods and the cultural value of the food, traditional recipes are frequently passed down via families, with grandmothers, mothers, and aunts teaching their culinary knowledge to newer generations (Sharif et al., 2016). Many of Malaysia's traditional dishes have their origins in social gatherings and festivals. People come together for meals such as lemang (sticky rice cooked in bamboo) during Hari Raya Aidilfitri or yee sung (prosperity toss) during Chinese New Year during festivals and special events. These foods strengthen bonds between various communities and promote a feeling of cohesion and belonging (Muhammad et al., 2013).

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While some traditional cuisines haven't changed much throughout the years, some have to suit contemporary tastes and preferences. These historic recipes are kept current for younger generations while keeping their true character through imaginative reinterpretations and inventive presentations. Heritage foods are preserved and enjoyed in the context of modern culinary landscapes because of this dynamic progression (Abidin et al., 2022). Malaysia's cultural heritage must be protected and promoted in order to be preserved. In order to maintain the continuity of these foods, it is crucial to make efforts to record recipes, highlight traditional cooking techniques, and inform the next generation about their significance (Nor et al., 2012). Initiatives that support local producers and encourage sustainable practises also contribute to keeping traditional ingredients true to their original forms.

As a living representation of the country's cultural legacy, Malaysian heritage food provides a sensory tour through history, custom, and community. These delicacies, which range from modest street stalls to lavish family feasts, serve as a monument to the unity in variety that distinguishes Malaysia and go beyond mere gastronomic delight to become a beloved emblem of shared identity and history (Zainal Abidin et al., 2020).

Malay *kuih* (Malay ethnic dessert) can be considered as delightful chewy desserts that are mainly made from natural ingredients like tapioca flour, sweet potato flour, bananas, palm sugar, coconut milk, and glutinous rice (Sharifah et al., 2015). Traditionally, most of the ingredients in Malay *kuih* were obtained locally, and all of the natural resources were easily available due to the tropical

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climate of the country (Raji et al., 2017). A nation's cultural legacy is significantly influenced by its traditional foods. Traditional meals are, however, losing favour as a result of globalisation and technological innovation. The emergence of new food items that cater to shifting customer preferences is mostly to blame for this drop in appeal.

Although earlier research has emphasised the importance of Malaysian heritage foods in maintaining cultural identity and strengthening ties within the community (Lee, 2023; Abidin et al., 2022; Sharif et al., 2016), little is known about how traditional Malay *kuih* is preserved and commercialised using contemporary food product development techniques. Few studies examine the creation of premix formulations as a way to maintain traditional recipes while addressing accessibility and convenience, despite the fact that several studies recognise the adaptation of heritage foods to modern consumer tastes (Nor et al., 2012; Abidin et al., 2022).

By exploring the possibility of *kuih bakar* premix in maintaining cultural food traditions while meeting contemporary consumer demands, this study seeks to close these gaps.

2.2.1 *Kuih Bakar*

Kuih bakar is a wonderful and unique traditional *kuih* from Malaysia that has a special place in the nation's culinary heritage. *Kuih bakar* is listed as one of the Malaysian heritage foods by the Department of National Heritage Malaysia. The Department of National Malaysia is one of the government

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agencies that has listed most of the heritage foods, including tangible and non-tangible items, in order to preserve the nation's heritage (Department of National Heritage Malaysia, 2020).

This delicacy showcases the diverse cultural heritage of Malaysia through its tastes, components, and techniques of preparation. The name '*kuih bakar*' means 'baked cake,' which reflects the way of preparation to make this *kuih*. *Kuih bakar* is moulded into the shape of a frangipani flower, known in Malay as *bunga kemboja*. Hence, some people call *kuih bakar* as *kuih bakar kemboja* too due to the shape of the *kuih*. Not only that, the other name for *kuih bakar* is *kuih bakar pandan* due to its *pandan* flavour. Despite all these names being called by the citizens, the name of this *kuih* is more commonly known as *kuih bakar* because of its popularity, which is more frequently known as *'kuih bakar'* by the folks (Department of National Heritage Malaysia, 2020).

Kuih bakar is renowned for its aromatic essence, which is evocative of the scent of coconut milk and *pandan*. It is frequently distinguished from other traditional sweets by its golden-brown colour and slightly sticky texture, which give it a distinctive mouthfeel (Sharifah et al., 2015). Wheat flour, sugar, coconut milk, and *pandan* leaves offer a natural green colour and added aroma and are carefully blended to create *kuih bakar*. The mixture is then carefully placed on a pan and baked until the exterior and interior are just slightly caramelised and soft. The result is a delicious treat that combines both the time-honoured flavours and the artistic skill that has been handed down through the centuries (Sharif, Nor, et al., 2013). During festive occasions,

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cultural festivities, and family get-togethers, *kuih bakar* is frequently eaten. Malaysians love it because of its distinctive flavour profile and cultural significance because they get to enjoy a treat that captures the spirit of their culture (Raji et al., 2017).

Although *kuih bakar's* precise origins are not known, it is thought to have developed into a classic delicacy loved throughout Malaysia. This *kuih* is a representation of local flavours from Malay culinary history. The intermingling of cultural communities, such as the Malay, Chinese, and Indian inhabitants, has undoubtedly had an impact on its evolution and added to the variety of Malaysian cuisine (Omar et al., 2015). *Kuih bakar's* historical beginnings are still a little hazy, but the *kuih's* persistent appeal and cultural importance in Malaysian society prove that it still has value today.

Heritage foods like *kuih bakar* must be preserved as culinary trends change and modern tastes emerge. It is evidence of the value of preserving cultural identity through cuisine while also allowing for imaginative modifications that can make this beloved *kuih* accessible to a larger audience (Abidin et al., 2022). *Kuih bakar* continues to be a symbol of Malaysian culture and tradition, bringing people together to celebrate the tastes and tales of their common history, regardless of whether it is savoured for its nostalgic flavours or discovered as a new culinary adventure.

There is limited research on modernising and commercialising *kuih bakar* to ensure its continued relevance in modern food markets, despite the fact that

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it is recognised as a Malaysian heritage cuisine and has significant cultural importance (Department of National Heritage Malaysia, 2020). Although its historical significance and traditional preparation techniques have been documented by studies (Sharif et al., 2013; Raji et al., 2017), little is known about how product innovations, like premix formulations, can support its authenticity while meeting the needs of contemporary consumers for accessibility and convenience. Furthermore, there are still few studies on the scientific and technological developments in the manufacture of *kuih bakar*, such as ingredient substitution, and optimisation. It is imperative that these gaps be filled in order to preserve the cultural and sensory integrity of this beloved heritage food and make it available to future generations.

Figure 2.1 : *Bunga Kemboja* or in English Known as Frangipani Flower Which is Also One of the Malaysian's Favourite Flowers, Where the Flower Could Be Easily Found in the Garden and at the Roadside

Figure 2.2 : The Mould of *Kuih Bakar* Which is in the Frangipani Flower Shape

Figure 2.3 : *Kuih Bakar*

2.3 Consumers

Consumers are people or organisations who buy or use products and services for their own needs or consumption. They are essential to the economy because their decisions and preferences affect the demand for goods and services, which in turn affects market trends and corporate plans (Moisander & Valtonen, 2006). The term ‘consumer behaviour’ refers to a broad range of

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activities, including product evaluations, brand preferences, purchasing decisions, and the consumption patterns that underpin different marketplaces and businesses. Understanding consumer behaviour can help you better understand how people choose, spend their money, and use the goods and services they find in the marketplace (Wang et al., 2023).

Consumers are at the centre of product creation in the food business, both directly and indirectly in the design of consumer products and commodity and industrial products. The emphasis in industrial product creation is on the immediate customer, but consumer acceptance of the product must be considered (Giacalone & Jaeger, 2023). Understanding basic consumer behaviour and food selection, as well as individual product and consumer interaction, is critical in product creation. Interdisciplinary social science and science research has advanced understanding of food consumer behaviour and food choice over the last 30 years (Earle et al., 2001).

2.3.1 Importance of Consumers

In the food industry and the process of creating new food products, consumers play a crucial and vital role. They have an impact on all aspects of these fields, from the early stages of concept generation to the eventual release of ground-breaking items on the market (Busse & Siebert, 2018). Consumers are important because of their capacity to offer insightful commentary, influence market trends, and direct the development of goods that speak to their needs and preferences (Moisander & Valtonen, 2006).

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Understanding consumers is essential for understanding the market and forecasting demand in the food industry. Consumer habits provide vital information about new food trends, nutritional choices, and changing tastes (Carreras-Simó et al., 2023). This understanding enables firms to plan efficiently and make wise decisions, ensuring that their products are in line with both present and future consumer wants. Businesses can foresee changes in consumer preferences and modify their products to satisfy these shifting expectations by studying and analysing consumer behaviour (Hellali & Korai, 2023).

Consumer studies start during the concept generation phase of product development. Consumer comments and suggestions frequently inspire original ideas that fill unmet requirements or satisfy preferences (Baker, 2009). This customer-driven strategy improves the relevance of new products while also raising their chances of connecting with their intended target market. Consumer choices are prioritised during the iterative process of refining these concepts, ensuring that the result is created to satisfy certain requirements and preferences (Busse & Siebert, 2018).

Input from consumers is especially important when it comes to the design and formulation of products. Businesses design goods that fit desired taste profiles and dietary requirements using preferences for flavours, textures, packaging, and nutritional content. Formulation decisions are influenced by consumer insights, which aid in striking a balance between sensory appeal and nutritional value (Guerrero et al., 2009). Consumer feedback is also directly

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provided on the flavour, aroma, texture, and overall experience of the product during sensory tests. With the use of this crucial knowledge, firms may adjust their products and enhance sensory qualities to better satisfy customers (de Kock & Magano, 2020).

Consumer validation and testing are also crucial to the development process. Businesses can detect possible problems and possibilities for development by conducting consumer testing on product prototypes (Earle et al., 2001). With each iteration, the process gets better, ensuring that the finished product not only lives up to consumer expectations but also provides a pleasurable experience (Siró et al., 2008).

Beyond product creation, consumers also have an impact on product introduction and continued development. Marketing tactics, package design, and communication methods are influenced by consumer insights. Businesses can improve the market placement of their products and forge closer relationships with prospective customers by crafting their messaging to resonate with consumer values and preferences(Grunert & Valli, 2001). Additionally, post-launch customer feedback helps firms make essential revisions considering real-world experiences, thereby assisting in the continuing innovation and growth of their product offerings (Cooper, 2014).

In conclusion, the success and innovation in the food industry and the development of new food products are driven by consumers. Their tastes, actions, and feedback shape these industries' whole course, ensuring that

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goods not only satisfy customer demand but also adapt to their changing requirements and wants (Busse & Siebert, 2018). In addition to being a strategic need, prioritising consumer insights is a crucial component of developing goods that enthral and engage a wide range of consumers (Feldmann & Hamm, 2015).

Although consumer influence in food product development has been the subject of much research, little attention has been paid to how consumer insights directly affect the modernisation and preservation of traditional heritage cuisines. Research on how consumer preferences and sensory expectations impact the reformulation or commercialisation of traditional foods like *kuih bakar* is lacking, despite the fact that previous studies have focused on consumer-driven innovation in mainstream and novel food products (Busse & Siebert, 2018; Guerrero et al., 2009). Furthermore, there are still few studies examining the harmony between preserving authenticity and adjusting to the needs of the modern market. For traditional foods to be sustainable while maintaining cultural identity, it is essential to comprehend how customers view and accept changes to them.

2.3.2 Consumer Perception

Food products' market success and acceptance, especially traditional cuisines like *kuih bakar*, are greatly influenced by consumer perception. Taste, texture, scent, convenience, and cultural importance are some of the elements that affect perception (Macfie, 2007). Consumer focus groups are frequently employed as an exploratory approach for the creation of food products in order

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to obtain a deeper understanding of consumer preferences and expectations. Researchers can get qualitative information on consumer opinions, expectations, and concerns about new food formulations through focus groups (Brown et al., 2020). A focus group discussion on the *kuih bakar* premix would yield insightful input on important product features including authenticity, ingredient transparency, and simplicity of preparation. Comprehending these perspectives is essential to guaranteeing that the premix fulfils customer demands and improves product acceptance.

Interviews with *kuih bakar* producers offer additional insights into the difficulties of producing *kuih bakar* using conventional methods, as well as their opinions on a ready-to-use premix, in addition to consumer viewpoints. Traditional baking methods and hand-measured ingredients are used by many local producers, which could result in inconsistent product quality (Guerrero et al., 2010). Researchers can find areas for improvement in premix formulation, like attaining the ideal ratio of flour, coconut milk, eggs, and pandan extract, by speaking with seasoned *kuih bakar* producers. Additionally, producers might offer insightful information on customer purchasing trends, such the inclination for fresh ingredients over pre-mixed ones. Some producers might also point out obstacles to using premix formulas, like consumers' mistrust of prepackaged food or worries about handcrafted *kuih bakar* losing its artisanal appeal. Designing a consumer-led premix that meets producer and customer expectations will require this information.

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Sensory evaluation is another important component of consumer perception and is a key factor in determining whether a product is accepted. Consumers evaluate product qualities such sweetness, texture, aroma, and overall satisfaction through systematic tasting tests as part of sensory evaluation (Grunert, 2002). Researchers can compare several formulations of a *kuih bakar* premix and identify the one that most closely resembles the traditional version's flavour through sensory evaluation. According to studies, consumers' perceptions are greatly influenced by their initial impressions, thus it is important to carefully optimise look, scent, and mouthfeel (Giacalone & Jaeger, 2023). Furthermore, sensory evaluation sessions yield quantifiable information about consumer preferences that can be utilised to improve the composition of the finished product. Adjustments can be made, such as increasing the moisture content for a softer texture or boosting the pandan flavour for a more genuine taste, if specific sensory characteristics receive lower ratings.

Convenience and usefulness also influence consumer perception, especially for those looking for time-saving meal preparation methods. According to research, consumers today choose items that are simple to use and require little preparation, especially premix products. Convenience and perceived quality, however, are frequently traded off, and customers may mistakenly believe that premixed items are less fresh or include artificial components (Scholliers, 2015). This emphasises how crucial effective marketing, and unambiguous labelling are in conveying the *kuih bakar* premix's authenticity and premium ingredients. Increasing market adoption and overcoming

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scepticism can be achieved by educating consumers about the advantages of premix formulations, such as consistency, time savings, and guaranteed taste. Additionally, as consumers are inclined to believe peer reviews when testing new food products, social media marketing and word-of-mouth recommendations might affect consumer perception (Zheng, 2023).

Creating a *kuih bakar* premix that is ready for the market will require a thorough grasp of customer perception obtained from focus groups, producer interviews, and sensory evaluation. A consumer-driven strategy guarantees that the premix satisfies sensory expectations, convenience needs, and cultural relevance by integrating qualitative and quantitative research approaches. Furthermore, addressing certain obstacles like mistrust of premixed products and placing a strong emphasis on authenticity and quality will increase consumer adoption and trust. In order to satisfy the needs of both contemporary, time-conscious consumers and admirers of traditional cuisine, a good *kuih bakar* premix formulation must ultimately strike a balance between tradition and innovation.

There is little research on how consumers view the harmony between tradition and convenience in heritage food premixes like *kuih bakar*, despite the fact that prior studies have looked at consumer perception in food product creation. Consumer trust in premixed traditional foods and the perceived trade-off between authenticity and modern formulation are not well-examined in the literature that currently exists, which focusses on sensory evaluation and convenience-driven product acceptability. Furthermore, research on

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traditional *kuih bakar* producers' viewpoints on premix adoption is still lacking, especially when it comes to their worries about artisanal value, consistency, and ingredient transparency. To successfully formulate and get market acceptability of a *kuih bakar* premix that satisfies both traditional and consumer expectations, it is imperative to address these gaps.

2.4 New Product Development (NPD)

The new product development (NPD) literature emphasises the importance of introducing new products on the market for continuing business success. Its contribution to the growth of companies, its influence on profit performance, and its role as a key factor in business planning have been well documented (Cooper, 2006). New products are responsible for employment, economic growth, technological progress, and high standards of living. Therefore, the study of NPD and the processes through which they emerge is important (Grunert & Valli, 2001).

In the last few decades, the number of new product introductions has increased dramatically as the industry has become more aware of the importance of new products to business. Correspondingly, managing the NPD process has become a challenge for firms as it requires extensive financial and human resources and is time-sensitive (Moskowitz et al., 2012). The harsh realities are that the majority of new products never make it to market, and those that do face a failure rate somewhere in the order of 25 to 45 percent. For every seven new product ideas, about four enter development, one and a half are launched, and only one succeeds (Bhuiyan, 2011).

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Despite the extensive research on how to achieve success in NPD, firms continue to deliver products that fail, and therefore NPD ranks among the riskiest and most confusing tasks for most companies. As the number of dollars invested in NPD goes up, the pressure to maximise the return on those investments also goes up (Moskowitz et al., 2009). It becomes worse as an estimated half of the resources allocated to NPD are spent on products that are cancelled or fail to yield an adequate financial return. Companies that have successfully launched new products are more likely to have some kind of formal NPD process, and they generally pass through all of the proper NPD stages (Bhuiyan, 2011; Cooper, 2006).

Product development strategies can be described in terms of reactive or proactive strategies. A reactive strategy is based on dealing with turbulence in the environment (e.g., changing consumer needs) as it occurs, whereas a proactive strategy would specifically allocate resources in order to be first on the market with a product that a competitor would find difficult to achieve (Simeone & Marotta, 2010). One of the most investigated determinants of new product performance is the relationship between marketing (e.g., the consumer focus group) and research and development (R&D) (e.g., food processing and sensory evaluation) in the NPD process. Many empirical studies have demonstrated that effective integration of marketing and R&D increases the likelihood of new product success (Cooper, 2011).

The importance of integrating sensory-oriented research and marketing research techniques into the design of new products, comes from the failure

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of taste tests to predict the market performance of new food products, even if sometimes this need has to do with the inability of marketing researchers to perform such tests effectively (Stone et al., 2012). Food scientists can make a contribution to the ability of food producers to conduct experiments planned to predict consumer preferences and choices. For these experiments, it is important to consider the marketing context that will provide the necessary external validity, considering not only the taste and other sensory attributes but also all the other product performance attributes that contribute to creating the product perception (Simeone & Marotta, 2010).

In sensory research, the objective is to understand how individuals respond to exposure and sensory information, whereas in consumer research, the objective is to predict consumer purchase decisions in a dynamic, complex environment (Kilcast, 2010). Product innovation can be instrumental for firms that want to respond to changes in the business environment and be market-oriented. Sensory analysis is important in terms of designing, testing, launching, and rethinking food products. When these tools are conceived not only as a unique science but also jointly with other fields in marketing research, the interdisciplinary approach increases the potential and effectiveness of research and development (Moskowitz et al., 2012).

Products achieve market success when they meet a genuine need at an appropriate price, when their benefits are effectively communicated to the appropriate consumers, when they are distributed widely enough to be easily available for purchase, and when they live up to the expectations generated

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by their positioning. Consumer research is critical for getting all of these factors right and increasing your chances of success (Macfie, 2007).

Many food items still fail in spite of following organised new product development (NPD) methods, despite a great deal of study on the subject. This indicates a fundamental gap in our understanding of the factors that influence market success. Research on the effective fusion of sensory and consumer data to improve product acceptance is scarce, despite studies stressing the integration of marketing and R&D (Cooper, 2011). Although consumer testing and sensory evaluation are the main topics of current study (Stone et al., 2012), there is still a gap between favourable test results and real customer purchase behaviour. Furthermore, in the increasingly competitive food business, more research is required on how to optimise product development techniques to minimise failure rates. Filling in these gaps will help us better understand how to match product characteristics to customer expectations for increased market success.

2.4.1 Product Development of Heritage Foods

Food product development is a dynamic and complex process focused on producing novel, alluring, and marketable food products (van Kleef et al., 2005). This research strives to address changing culinary demands and provide distinctive answers to gourmet wishes. It is based on customer tastes, market trends, and scientific knowledge. It entails a methodical progression of processes, from concept development through product launch, each

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meticulously planned to enable the successful development and introduction of new or enhanced food items (Traynor, 2013).

The process starts with idea generation, during which new product concepts are developed based on input from customers, trends that are developing, or the desire to fill a market gap. These concepts are then developed further into more tangible ideas that consider the target market, sensory qualities, and packaging design. The concept's technical and economic viability is then assessed, considering the availability of ingredients, production capacity, and regulatory compliance (Kleef, 2006).

The formulation of recipes, where culinary skill meets scientific precision, is the core of food product development. To achieve the appropriate taste, texture, and nutritional makeup, ingredients are carefully chosen and proportioned. To make sure the final product meets customer expectations, prototypes are created and put through sensory testing. The prototype is refined through iterations based on user testing and feedback, resulting in a finished product that captures the core of the original concept while adapting to the target market's preferences (Januszewka, 2001). The process is completed with a market launch, where consumers are introduced to the new product using efficient marketing tactics. Adjustments can be made to sustain the product's relevance and success in a competitive and ever-changing food business environment through ongoing monitoring and post-launch reviews (Simeone & Marotta, 2010).

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Innovation, or adding newness to the heritage product, is a way to maintain the heritage food. This is because heritage is the nation's identity (Vanhonacker et al., 2013). For example, when people mention sushi, we know that food is Japanese cultural property, representing Japan. Though there are a variety of modern toppings on the sushi. To maintain cultural culinary traditions, revitalise old recipes, and ensure that they remain relevant in a food environment that is changing quickly, innovation of heritage food products is crucial. The identity and tradition of a town or region are reflected in the heritage foods, which have enormous cultural and historical significance (Ling et al., 2010).

Traditional meals, however, run the risk of being forgotten or marginalised as modern tastes change and global food trends emerge. Heritage foods can be modified and recreated through product development to appeal to modern consumers while preserving their original flavour (Basak et al., 2023). Additionally, creating advancements in heritage foods offers a way to innovate while bridging the gap between tradition and contemporary. Traditional foods can be converted into innovative and engaging culinary experiences by using scientific procedures, improved cooking techniques, and creative presentation methods (Albertsen et al., 2020). This strategy not only appeals to the younger generations who are looking for distinctive tastes and experiences but also sparks curiosity among a larger audience, including visitors and culinary enthusiasts, fostering cross-cultural understanding (Jalis, 2009).

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Product creation based on heritage foods also helps local producers and communities remain economically viable. Increasing the marketability and appeal of heritage foods can open up new commercial options for farmers, craftspeople, and small companies (Basak et al., 2023). The preservation of heritage food production techniques and ingredient procurement procedures is ensured by this economic empowerment, protecting the communities' cultural legacy. New product development techniques imposed on heritage foods will ensure that heritage foods continue to be a source of pride and satisfaction for future generations while also acting as a potent weapon for culinary innovation, economic progress, and cultural preservation (Zheng, 2023).

Research on how to successfully balance traditional authenticity with contemporary consumer tastes in food product development is still lacking, despite the fact that heritage food is acknowledged as a crucial cultural asset. Although research emphasises the value of innovation in maintaining traditional foods (Vanhonacker et al., 2013), little is known about how changes affect consumer acceptability and perception. Furthermore, the difficulties of combining scientific discoveries and sensory preferences while preserving the cultural uniqueness of heritage foods are not adequately covered by current research. To ensure its longevity in a cutthroat food economy, further research is required to determine how heritage food innovation may increase its appeal without sacrificing traditional values.

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2.4.2 Convenience and Premix Food Products

Convenience foods such as premix food products have become essential parts of today's fast-paced lifestyles, providing a number of advantages that meet the needs of contemporary customers. These goods offer a helpful option for time-constrained people who juggle hectic schedules because they provide a quick and simple method of meal preparation without sacrificing taste or quality (Nakano & Washizu, 2020). Premixes allow people with minimal culinary skills to enjoy homemade meals without a lot of planning or preparation because they have pre-measured components and simplified cooking procedures.

Premix and other convenience products' capacity to increase the price and accessibility of a variety of cuisines and flavours is one of their key benefits. With no need for specialised ingredients or culinary knowledge, consumers can now sample a variety of dishes from different countries. This democratisation of flavours encourages culinary inquiry and cultural appreciation and enables people to travel the world through food from the comfort of their own homes (Guiné et al., 2021). Additionally, by lowering food waste, convenience and premix goods support sustainability initiatives. The pre-measured portions guarantee that materials are utilised effectively, reducing the possibility of extra or unused portions, which frequently result in spoilage. These items fit with consumer preferences for eco-conscious products since they have longer shelf lives and fewer chances of waste (Barska, 2018).

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Convenience food such as premix food products promote culinary innovation and creativity in addition to their practical advantages. Consumers are routinely encouraged by manufacturers to try out different flavour combinations, component profiles, and cooking techniques. Additionally, by reducing time and streamlining preparation procedures, these items expedite kitchen operations for organisations in the foodservice sector (Contini et al., 2018). While consumers enjoy faster service and consistently high quality, chefs may concentrate on creative presentation and improving the dining experience (Abidin et al., 2022).

Essentially, convenience and premix food items provide adaptable solutions that meet the needs of modern living. They support cultural exploration and culinary innovation while also catering to convenience-driven consumer desires and helping to make food consumption more sustainable. These goods, which are an essential component of the contemporary food scene, continue to transform how we approach cooking, dining, and culinary creativity (Zainal Abidin et al., 2020).

There is little research on how convenience foods, especially premix products, support culinary innovation while preserving the authenticity of traditional flavours, despite their growing popularity due to their usefulness, accessibility, and ability to reduce food waste (Guiné et al., 2021; Barska, 2018). Although previous research emphasises their advantages in streamlining meal preparation (Nakano & Washizu, 2020), little is known about how consumers perceive the flavour, authenticity, and sensory qualities of premix items in

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comparison to freshly made meals. Furthermore, nothing is known about how premix goods have influenced the development of traditional cuisines and shaped contemporary culinary tastes. In order to support culinary evolution and sustainability while ensuring that premix food innovations meet changing consumer expectations, these gaps must be filled.

2.4.3 Stage-Gate Model

The Stage-Gate model, developed by Dr. Robert G. Cooper, provides a systematic method for product development. It is made up of stages and gates that assist ideas in progressing from inception to market introduction while also including helpful checkpoints for evaluation and decision-making. This paradigm supports innovation, risk minimization, and alignment with strategic objectives, in addition to facilitating efficient resource allocation (Cooper, 2021). The interdisciplinary approach of social science and science methods of this research were guided by this Stage-Gate model. Figure 2.4 below shows the Stage-Gate model developed by R. G. Cooper.

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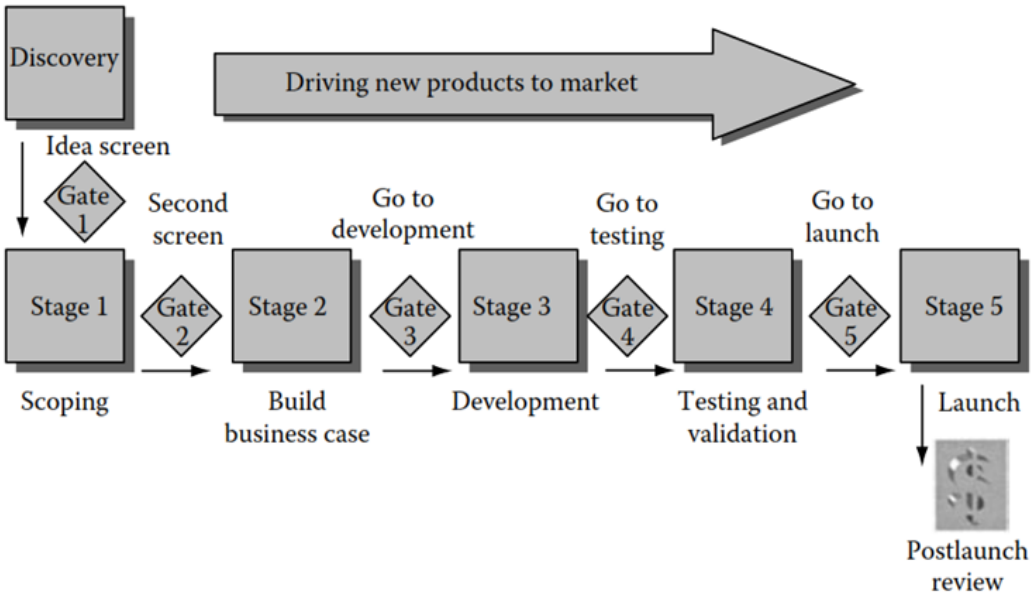

Figure 2.4 : Stage-Gate Model of New Product Development by R. G. Cooper

The Stage-Gate model above (Figure 2.4) was developed by Cooper (2001) and was used as guidance throughout this research study. Each stage in a Stage-Gate in a new product development process consists of completing a set of actions that are required or suggested in order to progress to the next stage of the product development process. The information acquired defines the goal of each stage and is used to identify how to reduce important project uncertainties and risks. The cost of progressing from one stage to the next can be properly managed throughout the development process (Cooper, 2021).

The actions within stages are carried out in tandem by the NPD team, which is made up of personnel from several functional departments within the organisation. As a result, each is multifunctional. There are no stages for research and development (R&D) or marketing; rather, each stage is for marketing, R&D, production, or engineering. No one owns a single stage.

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Tasks within a stage are completed concurrently. Each stage's gates serve as a checkpoint where a set of requirements is assessed. A panel of gatekeepers judges the project after the NPD team provides an overview of the set of actions at each step. The choice to continue with the project is contingent on the project answering a series of 'must-meet' or 'knock-out' requirements (i.e., a checklist) meant to exclude inappropriate ventures (Cooper, 2017).

The Stage-Gate model's five stages and five gates are explained in the following paragraphs:

Discovery

The process of developing a product begins with the discovery phase. This is the idea generating stage, where inspiration might come from many different places. According to R. G. Cooper (2011), new product ideas can come from a variety of sources, including conducting directed or fundamental technical research, looking for new technological possibilities, collaborating with innovative or lead users, conducting competitive analysis and inverse brainstorming of rival products, implementing an idea-suggestion programme, scanning the outside world, and using the Voice of the Customer (VoC). Preliminary evaluations are done during the 'Discovery' phase to see if the concepts are feasible and fit with the objectives and resources of the firm. Despite not being regarded as a proper gate, 'Discovery' lays the foundation for the levels that follow (Cooper, 2006). In regards to this current study, the 'Discovery' phase is the time when researcher search for ideas and topic of this research project.

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Gate 1: Idea Screen

Ideas come into being during the ‘Discovery’ stage, and then they move through the first gate. The choice to allocate resources to a project is taken at this stage. The project enters the preliminary investigation or scoping stage if the decision is to proceed. This gate is a ‘gentle screen’ made up of selecting a few important ‘must-meet’ and "should-meet" requirements that assess the strategic alignment, project viability, scope of opportunities, market attractiveness, product advantage, and project's compatibility (Cooper, 2001). The team decides which concepts should move on to the next round after determining whether the ideas are worthwhile to pursue further.

Stage 1: Scoping

This stage's primary goal is to evaluate the project's technical and commercial viability. A short concept test with groups of potential customers can also be included in a preliminary market assessment. These low-cost activities include internet searches, library searches, interactions with important users, and focus group studies. In addition to starting to establish the product concept, the goal is to ascertain the potential and likelihood of acceptance (Cooper, 2021).

Additionally, a rapid internal evaluation of the proposed product should be done as part of a preliminary technical assessment. Assessing development and production (or supply source) pathways, technical and operational viability, potential execution timelines and costs, and technical, legal, and regulatory risks and roadblocks are the main objectives (Cooper, 2017). In this

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current study, the researcher conducted focus group discussions (FGD) with the consumers and in-depth interviews with the producers in order to understand the customer needs and wants and also to determine the product concept. It is important to understand the voice of the customer (VoC) in any new product development project.

Gate 2: Second Screen

The procedure is simply a repetition of gate 1 with the addition of a more thorough screening, though the project is re-evaluated in light of the fresh knowledge learned from stage 1. The project is judged in accordance with the initial set of 'must-meet' and 'should-meet' requirements used at gate 1, as well as any additional 'should-meet' requirements pertaining to consumer response to the proposed product and any legal, technical, and regulatory requirements (Cooper & Sommer, 2018). The multidisciplinary group assesses the market's potential, the technological requirements, the financial ramifications, and the alignment with business goals. On the basis of this evaluation, judgements are made about whether to move forward with development or re-evaluate the concepts (Balbontin et al., 2000).

Stage 2: Build Business Case

The following step in the process involves defining the product definition, describing the project justification, and presenting a comprehensive project plan. This is known as developing a business case for the project. Prior to spending more money on the project, this stage entails a thorough inquiry that precisely identifies the product and confirms its allure (Cooper, 2013).

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To ascertain the needs, wants, and preferences of the consumer, market investigation and market research are conducted. This can be accomplished through competitive analysis, which shows where the proposed new product fits within the market (i.e., how similar or appealing it is compared to existing products). To translate consumer wants and "wish lists" into technically and financially viable solutions, a thorough technical assessment should be done. This stage includes lab work and preliminary design (Cooper, 2009).

Gate 3: Go to Development

A commitment to the product description and an agreement on the project plan are formed if a choice is made to proceed at gate 3. At this gate, the preliminary operations as well as the development plan are examined and approved. Each stage 2 action is given a qualitative review to ensure that it was carried out, that it was done well, and that the outcomes were favourable. The project is assessed in relation to the set of "must-meet" and "should-meet" requirements established at gate 2, and a financial analysis ought to be carried out as a result of a go decision for moving forward with development leading to a significant spending commitment (Cooper & Edgett, 2008).

Stage 3: Development

The development stage involved finding every criteria essential to produce a product prototype that can be tested on the market for consumer acceptability. To identify the final product formulation and processing parameters, which define the product technical specifications, laboratory and pilot plant tests are conducted. There are kitchen studies, then product screening, ballpark, and

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lastly optimisation studies. Thorough testing makes sure that the product complies with quality, safety, and regulatory criteria, which prepares it for the market (Cooper, 2017). In this current study, the researcher conducted the formulation and optimisation studies in the laboratory in order to fulfil the product concept and criteria based on the data gained from FGD and in-depth interviews with consumers and producers.

Gate 4: Go to Testing

This gate is used to assess how development work is coming along and to decide if the project should move on to the testing and validation stage. The gate makes sure that the task is finished and that the finished product complies with the initial requirements (i.e., product design specifications). To evaluate whether the product is prepared for market introduction, consumer input and test results are carefully examined. Assessing whether the product matches initial aims and customer expectations is part of the decision-making process at this gate (Cooper et al., 2002).

Stage 4: Testing and Validation

In the testing and validation phase, the product is thoroughly tested on target customers. Functionality, general enjoyment, and sensory characteristics are evaluated. Consumer testing results reveal any modifications or improvements that must be made to the product before it is finally introduced. This stage's goal is to evaluate and confirm the project's feasibility (i.e., the product, process, and consumer acceptance) based on a variety of activities. Internal product evaluations were conducted at this stage to examine a

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product's performance under controlled circumstances, a more thorough laboratory, pilot plant, and small-scale testing (Cooper, 2017). In this current study, the researcher conducted the hedonic sensory tests and the overall acceptability tests of the developed product to the targeted consumers.

Gate 5: Go to Launch

The goal of this gate is to set up complete manufacturing and operations in preparation for the market debut. In the testing and validation step, a panel of gatekeepers evaluates the effectiveness of the activities and the outcomes. The product launch strategy and launch plans (activities and monitoring) are authorised, and the full marketing and operational plans are examined (Cooper, 2014).

Stage 5: Launch

Implementing the production, operational, and marketing launch strategies constitutes Stage-Gate's last stage. After the product has been on the market for a designated period of typically 6 to 19 months, an assessment of the launch's success and performance is done. The final step should be done to conduct a product launch review that looks at the most recent statistics on revenues, costs, expenditures, and profits, as well as production, marketing, and distribution for strengths and shortcomings. It should also consider what the NPD team can learn from the process and how to make improvements for the following project (Cooper, 2011). In this current study, the researcher decided to stop the project at the 'Launch' stage due to time and budget constraints as well as limited resources. However, it is suggested that any food

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industrialists who are interested in making and selling this premix *kuih bakar* can continue with the market launch. This is because this stage is only possible after the product has entered the market.

Post-Launch Review

The process of developing a product continues with the post-launch review. The product's post-launch performance is assessed in comparison to predetermined goals and success criteria. This thorough evaluation determines whether the product has lived up to consumer expectations and deserves further expenditure (Cooper, 2001).

Conclusion of the Stage-Gate Model

The Stage-Gate model, which integrates stages and gates to ensure that concepts are improved, evaluated, and optimised before market launch, offers a strategic and systematic approach to product development. A full investigation of concepts, well-informed decision-making, and continual evaluation are made possible by including 'Discovery' together with five stages and five gates across the whole product development process (Cooper, 2011).

In these contexts, both qualitative and quantitative research approaches were applied. Qualitative approaches are important in all exploratory phases and for obtaining depth of understanding, but quantitative methods can corroborate qualitative research hypotheses and specify the scope and size of opportunities (Macfie, 2007). According to Cooper (2021), this Stage-Gate model is not stagnant in the sense that many of its practitioners have adjusted

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the model based on their own type of project and their feasibility and possibility of completing the project. In other words, this model is flexible and practical to be practised by various researchers and NPD teams.

2.4.4 Other Models

This chapter will discuss other models besides the Stage-Gate model. The first model is “The New Product Success Equation” by Moskowitz H.R., Saguy S.I. and Straus T. in 2009 (Figure 2.5). This model approaches new product development in a fundamentally different way by emphasising essential success elements as opposed to a strict, step-by-step procedure. This approach is goal and objective-based, which means that rather than outlining precise procedural procedures, it places more emphasis on defining particular goals that are necessary for the development of the product. This equation stresses results oriented development, as contrast to traditional frameworks that concentrate on organisational processes. This guarantees that every choice directly affects the success of the finished product. Additionally, it acknowledges that product creation is fluid rather than linear and encourages dynamic, team-oriented collaboration. It guarantees that crucial components like product quality, customer acceptance, and market positioning are successfully handled throughout the development process by combining a variety of departmental skills (Moskowitz et al., 2009).

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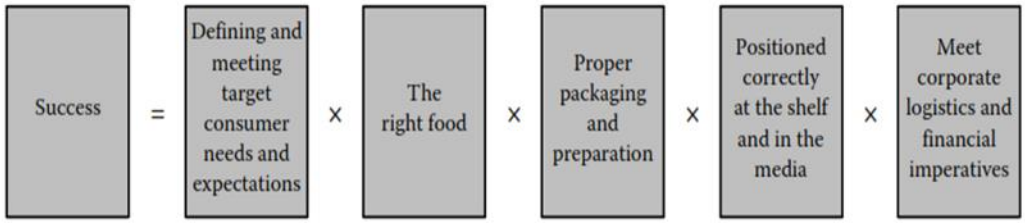

Figure 2.5 : The New Product Success Equation by Moskowitz H.R., Saguy S.I. and Straus T

The New Product Success Equation's scalability, which allows it to be used by companies of all size from startups to multinational conglomerates is another important characteristic. This flexibility enables businesses to effectively deploy resources while guaranteeing that all critical success criteria including customer demands, product attractiveness, and financial sustainability are satisfied. Crucially, the model is technically built as a multiplicative equation, which implies that a single area of weakness can drastically lower the likelihood of success overall. Cost optimisation, for instance, is essential for financial viability, but making excessive sacrifices in terms of ingredient quality or packaging aesthetics may discourage repeat business and ultimately result in market failure. By avoiding trade-offs that can endanger success, this dynamic and interactive strategy guarantees that businesses make balanced decisions on all facets of product development (Moskowitz et al., 2009).

The Success Equation defines six critical elements that must be optimized: meeting consumer needs, delivering the right product, ensuring proper packaging, positioning correctly in the market, and fulfilling corporate financial and logistical requirements. Every component has an equal impact on the

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finished result, which emphasises the necessity of a comprehensive, department-wide approach. To improve each element and raise overall product success, the model promotes constant cooperation between marketing, R&D, sales, operations, and management. The formula gives businesses a flexible framework that puts consumer-driven innovation, operational effectiveness, and profitability first rather than depending on a set development sequence. This increases the likelihood that a product will succeed in the long run (Moskowitz et al., 2009).

The next model is the “Product Development Strategy Generator” by Earle M., Earle R. and Anderson A. in 2001 (Figure 2.6). By combining several strategic components, this is a thorough model intended to direct the creation of new food products. In order to guarantee that new products contribute to the overall success of the company, this model highlights the significance of coordinating product development with more general business objectives. Business strategy, innovation strategy, marketing strategy, technology strategy, product strategy, and product development strategy are the six main parts of the generator. Every one of these elements is essential in determining the course and implementation of new product development (NPD) projects.

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Figure 2.6 : Product Development Strategy Generator by Earle M., Earle R. and Anderson A

The Business Strategy component makes sure that the NPD process supports the long-term vision and mission of the organisation by concentrating on its broader aims and objectives. How the business will encourage creativity and innovation, find new opportunities, and capitalise on special strengths is covered in the Innovation Strategy component. To make sure the new product satisfies consumer demands and differentiates itself from rivals, the marketing strategy component is crucial for comprehending consumer preferences, market demands, and competitive dynamics. Together, these three elements provide the NPD process a defined direction and guarantee that it is in line with both internal resources and external market dynamics (Earle et al., 2001).

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In order to ensure that the business can successfully convert creative concepts into marketable products, the Technology Strategy component concentrates on the technological resources and competencies needed to build the new product. In order to make sure that the new product satisfies customer wants and complements the company's strategy and brand, the Product Strategy component specifies the precise features and value proposition of the product. Lastly, the Product Development Strategy component describes the comprehensive plan for carrying out the NPD process, including deadlines, the distribution of resources, and significant benchmarks. The Product Development Strategy Generator offers a comprehensive framework for handling the intricacies of NPD by combining these six elements, guaranteeing that new food products are created successfully and efficiently while being in line with the strategic goals of the business (Earle et al., 2001).

Cooper's Stage-Gate model is the most relevant of the three models in managing new food product development (NPD) because of its methodical, risk-reduction strategy. The New Product Success Equation by Moskowitz, Saguy, and Straus provides a flexible, goal-oriented framework that guarantees all success criteria are taken into account, but it is devoid of a precise, sequential procedure to lead teams through the various stages of development. Similarly, by combining business, innovation, marketing, and technological strategies, Earle's Product Development Strategy Generator offers a comprehensive, strategic viewpoint; nevertheless, it lacks a methodical framework for risk assessment and decision-making at various

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phases of development. By dividing the NPD process into structured stages and including gates that act as crucial evaluation points, the level-gate approach, on the other hand, excels at enabling businesses to effectively allocate resources, methodically assess risks, and make go or no-go choices at each level. By ensuring that only high-potential products advance, this methodical approach lowers the possibility of expensive failures. It is also the most realistic, effective, and risk-averse paradigm for food product development because of its cross-functional cooperation and iterative improvements, which enable businesses to strike a balance between innovation and viability.

2.5 Chapter Summary

This chapter offers a thorough summary of the main subjects that are pertinent to the research. An introduction to Malaysian heritage food is given at the outset, emphasising *kuih bakar*'s cultural relevance. The chapter goes on to discuss consumer behaviour, stressing how crucial it is for the food sector to comprehend the demands and views of its customers. New Product Development (NPD) is then covered in detail in this chapter, with special attention on heritage foods, convenience foods, and premix foods. The Stage-Gate model is thoroughly examined, along with parallels to other frameworks, as part of the discussion of several NPD models. The study's foundation is laid by this literature evaluation, which incorporates knowledge about organised development processes, product innovation, and consumer preferences.

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CHAPTER 3

GENERAL METHODOLOGY

3.1 Research Design

This thesis is presented based on working chapters, whereby on overall it consists of 7 chapters. Chapters 4–6 represent objectives 1–3, and each chapter explains in detail the methodology that was used to achieve each of the objectives. Therefore, this chapter, which is ‘General Methodology', will only explain the methods used in this research study in general. Figure 3.1 below shows the research flow chart for this study.

Food product development is a costly project, and it requires thousands to millions of ringgit for a single project. It is a waste of money if the developed product fails in the market (Moskowitz, 2022). Thus, before developing a product, it is more effective to interact with the consumers and understand their needs and opinions regarding the product. By understanding the consumers, the researcher will have a better picture of what kind of product they desire. Based on Figure 3.1 below, the first objective, which is conducting FGD with the consumers, is essential so that the researcher understands the consumers better. It is a waste of money if the researchers develop a product only to know that it is unsellable.

The second objective, which is conducting an in-depth interview with the *kuih bakar* producers, is an effective method to understand the challenges of making *kuih bakar* traditionally from scratch. By understanding the difficulty

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faced by the producers who made *kuih bakar* daily, the researcher gained better insights into what kind of product to be developed. Through this way, the researcher could develop a better product for the consumers in the next step of this research.

Lastly, the third objective is to develop the optimum formulation for *kuih bakar* premix using RSM. The data gathered from the FGD with consumers and the in-depth interview with the *kuih bakar* sellers above were used to develop the *kuih bakar* premix. Several trials and errors of the *kuih bakar* premix formulation have been conducted in the laboratory prior to conducting the design of experiment (DOE) and sensory evaluation sessions with the consumers. RSM was chosen as a method to optimize the *kuih bakar* premix formulation, with the ingredients as the factors (independent variables) and sensory attributes as the responses (dependent variables). The optimum curve from RSM indicates that the best and optimum formulation has been achieved.

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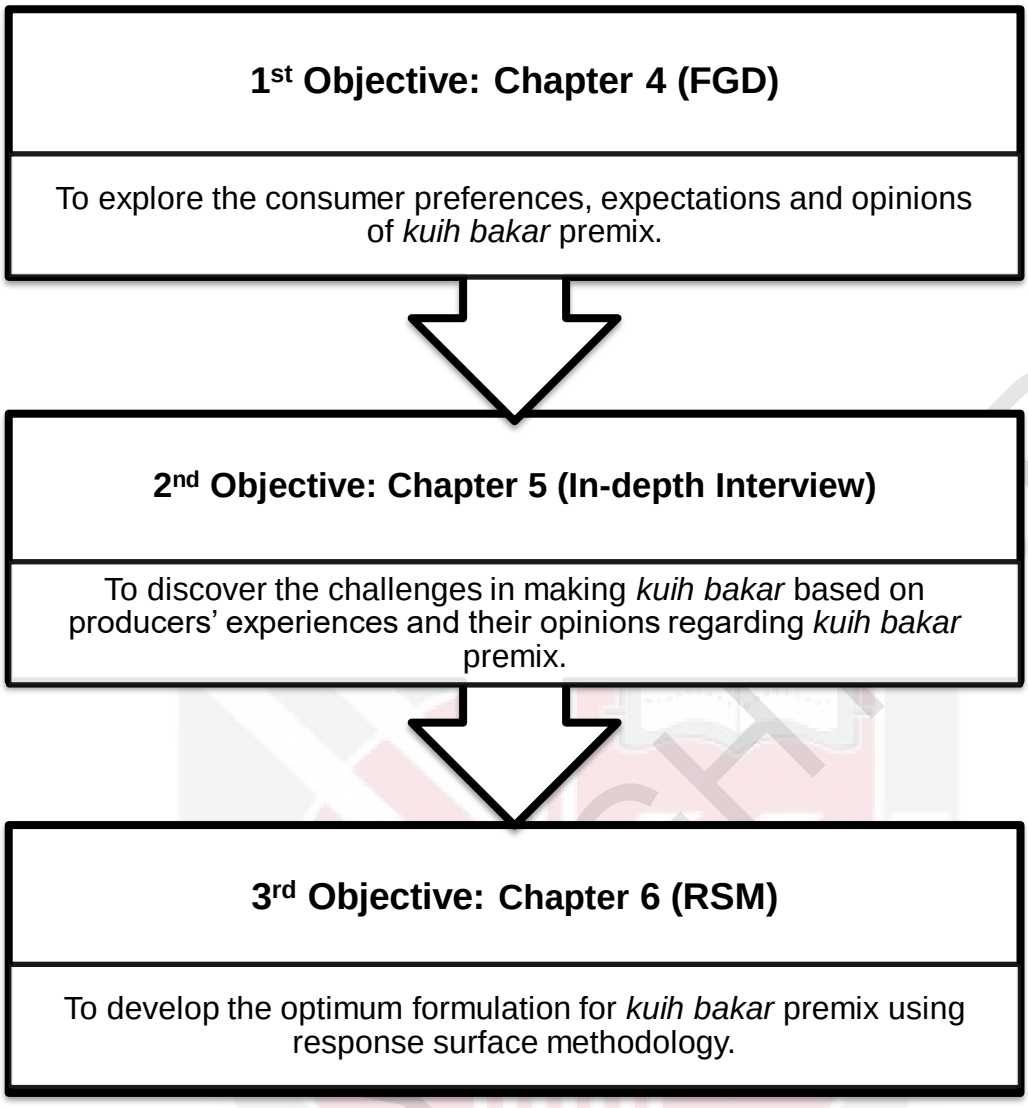

Figure 3.1 : The Research Flow Chart for This Research Study, Which is Interdisciplinary in Social Science and Technical Science Disciplines

3.2 Interdisciplinary Study

Interdisciplinary study involves collaboration and knowledge synthesis across several academic disciplines in an effort to address complex problems that cannot be fully comprehended or solved by a single field alone (Balbontin et al., 2000; Cooper & Edgett, 2008). Interdisciplinary techniques offer a thorough framework for delving into complex subjects by fusing methodology, theories, and viewpoints from diverse fields. This method fosters innovative

thinking since it invites academics and researchers to cross disciplinary boundaries, developing a greater knowledge of complicated phenomena and providing opportunities for fresh approaches (van Kleef et al., 2005).

This research's innovative interdisciplinary study of social science and technical science studies spans the gap between two domains to provide a thorough and comprehensive grasp of the research issue. The technical science studies concentrate on the technical and scientific facets of food product development, whereas social science explores the cultural and behavioural factors that impact how people interact with food. The interaction between traditional foods, consumer tastes, and technical improvements can be better understood by combining these disciplines (Simeone & Marotta, 2010).

3.3 Social Science Method

Understanding the complex dynamics that affect people and their interactions within social, cultural, economic, and political contexts is the subject of the systematic study of human behaviour, societies, and relationships known as social science (Visser & Haisma, 2021). It includes a variety of academic fields that each look at different facets of social life and society, including sociology, anthropology, psychology, economics, political science, and more. Research methodologies, data collection, analysis, and interpretation are used in social science to find patterns, trends, and insights that help us understand human behaviour, social structures, and societal phenomena better (Creswell & Poth, 2018).

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This research's social science component looks into the exploration of consumers needs and wants for the *kuih bakar* premix. This research explores the consumer preferences, expectations, and opinions of *kuih bakar* premix in the first objective. Then, in the second objective of this research, the researcher discovers the challenges in making *kuih bakar* based on sellers' experiences and their opinions regarding *kuih bakar* premix. In order to create products that appeal to consumer preferences, it is essential to understand the psychological and emotional ties that people have to heritage foods (Omar et al., 2015). In addition, the social science viewpoint explores the role that traditional foods have in fostering cultural identity, fostering ties among neighbours, and preserving culinary traditions, offering insights into the broader societal implications of food product development (Vanhonacker et al., 2013).

3.3.1 Focus Group Discussion (FGD)

Focus group conversations entail a moderated group discussion with participants who have common traits and are intended to explore perspectives, perceptions, and insights on a certain topic (Barbour, 2007) New product ideas were discovered to be more innovative as a result of the group's synergy. The development process values FGD since they can provide more expansive ideas than an individual could. They can develop ideas in ways that could not have been anticipated in advance with rigorous control. They can also encourage dialogue among participants to inspire originality and spontaneity (Macfie, 2007) Product developers can discover which features

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are most crucial, evaluate pricing sensitivity, and observe how the product might be utilised by talking with potential customers (Baker, 2009).

Focus groups help bridge the gap between researchers and consumers by moving more quickly, affordably, and adaptably than individual interviews. When there is limited information available about a product sector, they can develop concepts and look into the trade-offs that customers are making. The outcomes of consumer group discussions are in ready shape for generating the product concept and the entire base of the product design, which is the most crucial component in product development (Earle et al., 2001).

3.3.2 In-Depth Interview

An in-depth interview is a qualitative research technique that entails a one-on-one discussion between a researcher and a participant. This type of conversation enables a thorough exploration of the participant's experiences, perspectives, emotions, and insights on a particular topic and produces rich and detailed qualitative data (Seidman, 2006).

Conducting in-depth interviews with *kuih bakar* producers is crucial in the context of this research project because it provides a direct and individualised perspective from people with first-hand experience in preparing and selling traditional food items. These interviews offer insightful information regarding the producers' familiarity with customary practises and their difficulties in making *kuih bakar* for a living. Researchers can learn about obscure details and cultural insights through one-on-one talks that may not be readily available

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through other research techniques (Lavelle et al., 2016). The in-depth interviews enable a deeper examination of the producers' emotional ties to the food, their perceptions of the culinary heritage, and the practical considerations for upholding authenticity while satisfying contemporary needs, thereby enhancing the research's comprehension of *kuih bakar* within its cultural and gastronomic context.

3.3.3 Interview Protocol

In order to make sure that the questions in the interview protocol are in line with the goals of the study, it is first necessary to clearly state the research objectives and research questions. The questions in the protocol were created and emerged from the research questions (Saldana, 2016). A series of open-ended questions intended to generate thorough responses should make up the protocol, allowing participants to freely express their experiences, perceptions, and feelings. Start the conversation with broad questions to get people talking, then move on to more specialised questions that go deeper into certain subjects related to the study. Ask follow-up questions to delve deeper into intriguing or surprising answers (Seidman, 2006). It's critical to think through the question order in order to establish a logical flow that transitions from general to focused subjects and to allow the interviewer to adjust as needed based on the participant's responses. A brief introduction outlining the goal of the interview, ethical issues like confidentiality, and allowing participants to make any more remarks should all be included in the protocol. The protocol's questions can be improved for clarity and relevancy

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with the help of a pilot test, ensuring that the questions are understandable and efficient in obtaining the needed data (Creswell & Poth, 2018).

3.4 Technical Science Method

The investigation and application of scientific concepts to comprehend and enhance many facets of food production, processing, preservation, and consumption constitute the field of food science and technology. To solve the complicated issues related to the food industry, it involves a variety of disciplines, including chemistry, biology, physics, engineering, and microbiology, among others (Macfie, 2007). In order to improve food quality, safety, and nutritional value, food scientists and technologists examine the chemical, physical, and biological aspects of ingredients and their interactions during processing. In order to create new goods, enhance food processing procedures, and guarantee that food is still safe, nourishing, and enticing to consumers, they also investigate cutting-edge techniques and technology (Moskowitz et al., 2009).

Technical science studies evaluate the technical aspects of food product creation from a scientific perspective. In this current study, the science discipline's part is where the researcher develops the optimum formulation for *kuih bakar* premix using response surface methodology (RSM) in the laboratory. By incorporating scientific studies into the research, traditional recipes can be optimised using cutting-edge methods. This research addresses consumer needs while also respecting the authenticity and heritage of traditional foods and utilising the advantages of contemporary technology

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to increase their total worth and appeal (Albertsen et al., 2020). It does this by merging the viewpoints of both the social science and technical science aspects.

3.4.1 Formulation Development and Sensory Evaluation

The process of developing a well-balanced and optimised recipe or formula for a food product is known as formulation development in the context of food product development. In order to obtain the desired taste, texture, nutritional value, and other sensory qualities, accurate measurements and ingredient combinations must be determined (Ochieng et al., 2023). When developing a formula, various aspects are taken into account, including the compatibility of the ingredients, their functioning, the processing techniques, and the cost. In order to ensure the viability of large-scale production, a product that satisfies both consumer preferences and quality criteria is important (Siró et al., 2008).

On the other hand, sensory evaluation entails evaluating a product's sensory qualities using human senses like taste, smell, sight, touch, and occasionally sound. It is a crucial part of the development of food products. This evaluation offers insightful information on how customers evaluate the product's overall sensory experience, including its look, flavour, scent, and texture (Stone et al., 2012). Evaluations and the generation of factual information about the sensory properties of the product frequently involve the use of sensory panels or trained individuals. The gathered information is used to make educated decisions about product improvements, formulation changes, and whether the product meets customer expectations and preferences. To ensure that the

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finished product satisfies the specified sensory profile and maintains a high level of consumer satisfaction, sensory evaluation is a crucial component (Macfie, 2007).

3.4.2 Response Surface Methodology (RSM)

Response Surface Methodology (RSM) is a mathematical and statistical approach used in experimental design and optimisation to describe and analyse the interactions between numerous variables and a response of interest. In order to see how input variable levels affect the response variable, a set of experiments with systematically changing input variable levels must be designed (Moskowitz et al., 2012). RSM assists researchers in determining the ideal circumstances that maximise or minimise the response variable while taking interactions and quadratic effects among the input variables into account. RSM is frequently used to effectively explore and optimise complicated processes and formulations in industries like engineering, science, and the development of food products, directing the creation of goods and procedures that achieve desired goals (Athanasiadis et al., 2023).

RSM enables researchers to methodically investigate and improve intricate formulations and processes, which is essential to the creation of food products. It effectively analyses the interactions between numerous components, such as ingredients and processing conditions, and their impact on sensory properties, nutritional value, and other important features of the finished food product (Ashenafi et al., 2023). In order to ensure effective resource use, shorter experimentation times, and the production of high-

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quality food items that are in line with consumer tastes and industry standards, RSM equips researchers to identify the ideal combinations of variables that result in desirable product outcomes (Stone et al., 2012).

3.5 Chapter Summary

This chapter provides a general overview of the research process. This thesis is presented based on working chapters, and overall, it consists of 7 chapters. Chapters 4–6 represent objectives 1–3. The first objective will employ the FGD method (Chapter 4), the second objective will employ the interview method (Chapter 5), and the third objective will employ the RSM method (Chapter 6). The details on how to conduct each method were explained in the designated chapters.

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CHAPTER 4

EXPLORATION OF CONSUMER PREFERENCES AND THEIR OPINIONS OF *KUIH BAKAR* PREMIX

4.1 Introduction

Focus group discussion (FGD) was used as a medium to explore, communicate, and understand the preferences, expectations, and opinions of consumers regarding *kuih bakar* premix. This is important because, by understanding the consumers, the researcher can develop a good premix product by satisfying their needs and wants. Many new products on the market were recognised as fail products due to a lack of understanding among the target consumers. So, in order to avoid developing a failed product, the researcher conducted the FGD sessions with the target consumers. The target consumers were recruited based on the criteria discussed intensively with the respectable supervisory committees, which are also experts in the subject matter.

4.1.1 Objective

To explore the consumer preferences, expectations, and opinions of *kuih bakar* premix.

4.1.2 Research Question

What are the consumer preferences, expectations and opinions of *kuih bakar* premix?

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4.2 Methods

Focus group discussion (FGD) was employed in this study as the method for data collection. The data was transcribed with a verbatim technique. The FGD data was managed by the qualitative data management software NVivo 12. In total, 62 participants (n = 62), where 9 to 12 persons in each group (6 groups) were recruited. All of the FGD sessions have been conducted from December 2017 until March 2019. Each of the FGD sessions lasted for around 90 minutes to 120 minutes, with 15 minutes break in between. Free flow of drinks and snacks was provided during the FGD sessions so that the participants could enjoy it anytime, especially during the given break time.

The FGD participants were recruited based on the participant characteristics stated in sub-topic 4.2.1 below. The FGD participants were recognised as the target consumers for *kuih bakar* premix. Prior to recruiting the participants, the researcher had made an advertisement in the form of an electronic poster. The researcher advertised the recruitment of FGD participants on social media platforms such as Facebook, Instagram, WhatsApp, and Telegram. Several characteristics need to be complied by the FGD participants, so before the FGD session, the researcher contacted the potential participants to ensure their suitability with the characteristics. The snowball technique was also applied in this study; during the FGD sessions, the researcher asked for help from all the participants to advertise the FGD session to suitable and interested people.

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The FGD session was carried out in a conducive meeting room which is Jalamas Meeting Room, Faculty of Food Science and Technology, UPM. At the beginning of the FGD session, the researcher explained in detail the purpose of the research, procedures, risks of participation, and also their confidentiality as FGD participants. All this important information was written in a 'consent form' where they needed to put their signature on that form as an agreement between the researcher and the participants. Next, the researcher distributed the demographic questionnaires to the participants, and the filled-out forms were returned at the end of the session.

Each of the participants was given a piece of cardboard and a marker pen for them to write their name on, and then they were instructed to place it in front of them. This allowed the researcher to get to know the participant better during the session. A pen and blank A4 paper were also given to the participants during the sessions to express and write about anything that they wanted to discuss regarding the subject matter. The researcher also employed a note-taker during the FGD sessions to help with the field-note taking process. The researcher recorded the whole FGD session using a professional audio recorder (Remax IP1) and a handphone recorder (iPhone) as a backup. A token of appreciation was also given at the end of each FGD session to acknowledge all participants' time and effort.

Probing techniques were applied during the FGD sessions to better understand the consumers with deeper data. The data obtained from each of the FGD sessions was immediately transcribed and analysed so that the

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researcher could roll out the interview guide for the next FGD session until the data reached a saturation point. NVivo 12 was used as data management software. The data were analysed using thematic analysis techniques, and the themes were summarised in table form at the end of each sub-topic so that it is easier for the reader to see the overall findings.

By using a standardised moderating method and keeping uniform data gathering techniques throughout all focus groups, the consumer focus group study that was done for this research upholds reliability. This entails employing the same set of open-ended questions, making sure that guidance is consistent, and retaining an impartial and neutral demeanour throughout the dialogues. By creating thoughtful questions that examine many facets of consumer preferences for *kuih bakar*, validity is ensured. Moreover, the study improves the precision of the insights collected by promoting varied involvement and digging deeper into participants' responses. The validity of the study is further supported by the triangulation of focus group results with other qualitative and quantitative data sources, such as in-depth interviews and sensory studies conducted in the next chapter. This will corroborate and validate important conclusions.

4.2.1 Participant Characteristics

The participant characteristics were designed based on the main purpose of this whole research study. The participants were also recognised as the target consumers for the *kuih bakar* premix. A number of important considerations support the selection of the Klang Valley as the research site for *kuih bakar*.

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First off, with major cities like Kuala Lumpur, Petaling Jaya, Shah Alam, and others, Klang Valley is one of Malaysia's most urbanised and heavily populated areas. Due to its high population density and varied demographic makeup, this area is perfect for consumer research, including the development of food products and customer preferences (Ramli et al., 2016). Hence, adults who reside in the Klang Valley areas were deemed suitable for this study. Besides that, they also need to be consumers of *kuih bakar*, and *kuih bakar* is one of their favourite foods. This is because the participants need to know by heart the taste of *kuih bakar* so that they can express their preferences, experiences, and opinions regarding the subject matter. Next, the participants need to be interested in baking cakes and *kuih* because *kuih bakar* premix requires a baking process. Lastly, the participants also need to be interested in sustaining Malay heritage foods. This is because *kuih bakar* is a heritage food, and it is hoped that by introducing *kuih bakar* premix, it could serve as a medium to make this heritage food more sustainable in the future.

Therefore, the criteria for the participants are listed as follows:

i. Adult
ii. Resides in the Klang Valley
iii. *Kuih bakar* is one of his/ her favourite Malaysian heritage foods
iv. Consumer of *kuih bakar*
v. Consumer of convenience food products (example: cake premixes, instant premix soup, instant noodle, etc.)
vi. Interested in baking cakes and *kuih*
vii. Interested in sustaining Malay heritage foods

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4.2.2 Socio-Economic Profiles of Participants

The socio-economic profiles of all the participants were collected using a socio-economic questionnaire. The socio-economic questionnaires were distributed to the participants right at the beginning of the FGD sessions. These socio-economic profiles were simplified in Table 4.1 below. There are 62 participants (n = 62) involved in the FGD sessions, which consist of six groups.

Table 4.1 : Socio-Economic Profiles of the Participants for FGD

Socio-economic profiles		No. of participants (n=62)
Age	25 to 29 years old	21
	30 to 34 years old	15
	35 to 39 years old	14
	40 to 44 years old	8
	45 to 49 years old	3
	50 to 54 years old	1
Gender	Female	55
	Male	7
Marital status	Single	26
	Married	35
	Divorcee	1
Educational level	SPM	5
	Diploma	10
	Bachelor's degree	14
	Master's degree	27
	PhD	6
Monthly income	<RM1000	1
	RM1000 to RM2000	22
	RM20001 to RM3000	17
	RM3001 to RM4000	7
	RM4001 to RM5000	7
	RM5001 to RM6000	3
	RM6001 to RM7000	4
	RM7001 to RM8000	1
Baking frequency	1 time per month	10
	2 times per month	11
	3 times per month	2
	4 times per month	3
	5 times per month	1
	1 time per year	10
	2 times per year	7
	3 times per year	7

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Table 4.1: Continued

Socio-economic profiles	No. of participants (n=62)
4 times per year	3
5 times per year	8

4.3 Results and Discussions

The results showed that most of the consumers answered all the research questions. There are three main sub-topics written on this topic. Each sub-topic represents a research question. The data for the first research question was written and shown in the first sub-topic, followed by the next research question subsequently below. The data that emerged from each research question was summarised in table form at the end of each sub-topic.

4.3.1 *Kuih Bakar* Preferences

The participants, or later in this chapter, the researcher would like to address them as 'consumers'. This is because they have complied with all the characteristics of *kuih bakar* premix consumers, and they are indeed currently ready-to-eat (RTE) *kuih bakar* consumers too. The consumers have answered the research question on this sub-topic very well, where they have explained in detail their preferences and favourable characteristics of *kuih bakar*. The researcher has applied the thematic analysis of the data obtained, and each theme has been explained below together with the quotation from consumers. There are eight themes in this sub-topic, and the summary has been tabulated in Table 4.2 below.

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***Pandan* flavour.** *Pandan*, also known as screw pine leaf, is very common with the Malay community as a natural flavouring and also as an essence in cooking. *Pandan* also masks and covers the eggy taste of *kuih bakar*. Westerners often used vanilla essence, while the Malay community used *pandan* as an important essence in their cooking (Seng et al., 2005). One of the consumers mentioned that:

> *The smell and flavour of the egg are unpalatable, but when you put pandan into the batter, it somehow masks the eggy taste of kuih bakar. (FGD3, R2)*

The consumers also mentioned that *pandan* imparts a nice aroma and is fragrant too. Thus, the *pandan's* aroma makes *kuih bakar* more appetising and appealing to consumers. The consumer explained below:

> *I love kuih bakar simply because of its aroma. The pandan's aroma imparts a nice fragrance, and it is so appetising. Once I bit into a piece of kuih bakar, I wanted to eat more of it because of the pandan's aroma. (FGD6, R2)*

The FGD participants prefer *pandan* flavour for *kuih bakar* because most of them love the flavour. Another reason is that they have been familiar with *pandan* flavour since they were children. According to them, all generations love *pandan* flavour. *Kuih bakar* is always associated with *pandan* flavour because it is the original flavour for *kuih bakar*. *Pandan* is the flavour that they are familiar with; hence, if *kuih bakar* is in other flavours, they are reluctant to try it. One of the consumers stated that:

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I prefer pandan flavour because it's a very familiar flavour to me; if kuih bakar is in other flavours, it's unpalatable to me. Even my nephews and nieces love pandan flavour. (FGD6, R8)

Light green colour. Consumers prefer the light green colour because the dark and intense green colour is associated with too much synthetic colouring. Not only that, but they also mentioned that the intense and dark green colour looks fake to them. They demand a light green colour so that *kuih bakar* appears more palatable to them. The consumers also mentioned that the food-grade synthetic colouring is acceptable, but only in a small amount, as a large amount will impart intense colour and a bitter taste to the *kuih bakar*. However, very light green colour will appear unpalatable because they will assume that there will be too little *pandan* in *kuih bakar*, which will make *kuih bakar* appear unappetizing to them. One of the consumers stated that:

I prefer a light green colour for kuih bakar. I am not too fond of striking colour because it looks fake; however, too dull colour looks unpalatable and tasteless. So, synthetic colouring is fine to me, but not in large amounts; otherwise, the colour will be too striking. (FGD2, R12)

According to consumers, *kuih bakar* must be green because *pandan* flavour is associated with green. Therefore, if it is in other colours, the flavour will not be *pandan*. *Kuih bakar* is too synonymous with green; if it is in other colours, *kuih bakar* looks unpleasant to them too. *Pandan* imparts a natural green colour due to its high chlorophyll content (Ghasemzadeh & Jaafar, 2013). The consumers also mentioned that green is *kuih bakar's* identity. They explained it as below:

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Growing up, I only knew kuih bakar was green. The green colour comes from pandan. I am not interested in buying kuih bakar in other colours and flavours, though I found several colours, such as purple for yam and yellow for pumpkin, in the market. I am a person who eats what I am familiar with; kuih bakar is originally in green colour and pandan flavour, so other colours and flavours are a big no for me. (FGD2, R7)

The green colour is the identity of kuih bakar. If it is in another colour, people will not recognise it as kuih bakar. Kuih bakar is in pandan flavour, so definitely it is in green colour. It will be weird for pandan flavour to be in other colours than green. Flavour and colour need to match; otherwise, it will make people confused. (FGD6, R2)

Intermediate amount of sesame seeds. Sesame seeds have been proven to be consumed by humans for the past thousand years for cake and confectionery purposes. The wide usage of sesame seeds due to their highly stable oil content leads to a savoury, nutty, and roasted flavour and aroma (Kahyaoglu & Kaya, 2006). The consumers in this study love sesame seeds, but not too much because they will dominate the overall taste and flavour of *kuih bakar*. Hence, an intermediate amount of sesame seeds on top of *kuih bakar* is appropriate for them. Sesame seeds, in general, have a strong flavour and aroma. Thus, these explain the reasons why consumers prefer it to be in intermediate amounts only. One of the consumers stated:

I love sesame seeds, but I do not prefer sesame seeds to be put too much on kuih bakar. I prefer it to be in intermediate amounts only. This is because too many sesame seeds will dominate the overall flavour, aroma, and taste of kuih bakar*. (FGD4, R4)*

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The consumers also mentioned that sesame seeds impart a delicious nutty aroma and flavour. It also adds overall crunchiness to the texture of *kuih bakar*. Moreover, they also mentioned that sesame seeds are part of kuih bakar's identity, which makes *kuih bakar* more attractive. The consumers explained below:

> *Sesame seeds completed the overall taste and appearance of kuih bakar. Sesame seeds definitely enhanced the overall taste of kuih bakar, which imparts a nice and delicious nutty aroma. (FGD2, R11)*

> *Sesame seeds are* kuih bakar*'s identity; without them, kuih bakar looks less attractive. Furthermore, sesame seeds add overall crunchiness to kuih bakar. When I bite kuih bakar, I can feel the crunchiness of sesame seeds inside my mouth, which adds more joy while eating* kuih bakar*. (FGD3, R5)*

Crunchy with a little bit of burnt crust. The consumers prefer *kuih bakar* that is crunchy with a little bit of burnt crust. According to them, the crunchiness comes from the top side and the side of the petal's shape of *kuih bakar*. If they bake it in another mould's shape such as square, the crunchiness will come only from the top. Hence, *kuih bakar* has more crunchiness because of its mould, which is plumeria flower's shape. One of the consumers mentioned that:

> *I love the crust part of kuih bakar, especially when it is crunchy on the top and around the petals. When I baked another cake using a square's mould, the crunchiness only came from the top side, but for kuih bakar, it had more crunchiness around it. (FGD1, R8)*

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The consumers also love *kuih bakar* with a bit of burnt crust because if it is too burnt, it will impart a bitter taste. The burnt crust makes it even crunchier, flavourful and tastier. The consumers mentioned that, since its name is *kuih bakar, 'bakar'* if translated into English is 'burnt'. Thus, it must be a bit burnt on the crust part synonymous with its name. The consumers stated below:

> *Kuih bakar needs to have a crunchy texture from the crust part. It also must be a little bit burned, but not too burned until it imparts a bitter taste. When the crust part is crunchy with a little bit of burnt crust, it is delicious. (FGD2. R8)*

> *Kuih bakar is tasty when it has a burnt taste from the crust. A little bit of burnt from the outside but soft and chewy on the inside. (FGD5, R2)*

The crunchiness and burnt crust were formed because the surface of *kuih bakar* was hotter than the internal. The oven needs to be at a high temperature so that browning effects, also known as the Maillard reaction, will occur, and then it will produce a nice flavourful burnt crust (Amendola & Rees, 2003, p. 166).

Soft and chewy. Consumers prefer *kuih bakar* soft and chewy because they feel it is easy to swallow with this kind of texture. Not only that, but the consumers also demand *kuih bakar* to be moist and not too hard. The moistness of bakery products is related to their water content. Thus, the amount of water is also vital to produce a soft and chewy product (Zhou et al., 2014). *Kuih bakar* also needs to have a light texture because a heavy and hard texture indicates that it has a lot of wheat flour with very little coconut milk and eggs. However, the softness, lightness, and moistness have to be

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differentiated from the mushiness. It must not be too soft, too light, or too moist until it becomes mushy. *Kuih bakar* that is mushy appears unappetising to them. The consumers explained below:

> *I like kuih bakar that is soft and easy to swallow, and I can feel the moistness of kuih bakar inside my mouth. It also has to be soft but not mushy; I hate when it is too mushy. (FGD5, R8)*

> *I prefer kuih bakar that is chewy and it has a light texture and is not too heavy. Usually, if the texture is too hard and heavy, it indicates that it has too much flour. (FGD2, R4)*

> *I prefer a chewy texture for kuih bakar, when I chew it inside my mouth, it's easy to swallow, and also, it's not too dry, I prefer it to be moist inside. (FGD2, R11)*

The consumers also mentioned that they love eating *kuih bakar* because of the variety of experiences while eating it, such as crunchy for the crust and then soft and chewy for the middle part. It somehow brings so much pleasure to them to experience these while eating *kuih bakar*. One of the consumers stated that:

> *I love kuih bakar because of the variety of textures that I experienced while eating it. It's crunchy on top with the crunch of sesame seeds, and then the middle part is chewy and soft. Somehow, it's difficult to find these kinds of textures for kuih. I think kuih bakar is unique because I feel a variety of feelings and experiences while eating it, which gives me so much pleasure. (FGD1, R2)*

Creamy and intermediate level of sweetness. These are important characteristics for *kuih bakar* according to consumers. These both

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characteristics were said to be a great combination for *kuih bakar*, which makes it taste delicious. The consumers mentioned that if *kuih bakar* is just creamy without sweetness, they will not call it *kuih bakar*. These characteristics are crucial because when *kuih bakar* has a well-balanced combination of creamy and sweet, it produces a great taste. The consumers also stated that they favour *kuih bakar* that is at an intermediate level of sweetness. This is because *kuih bakar* is already creamy, and when it is too sweet, it makes them feel queasy and nauseous. The consumers explained below:

> *I prefer kuih bakar that is creamy and sweet; these both characteristics are a great combination, which makes kuih bakar taste super delicious. If kuih bakar tastes just creamy without the sweetness, it will definitely taste bland, I will not call it kuih bakar. (FGD5, R1)*

> *I like the sweetness of kuih bakar, but at an intermediate level of sweetness only. Probably because kuih bakar is already creamy and rich, but when it's too sweet, it makes me queasy and nauseous. (FGD6, R4)*

They also mentioned that too much sugar might overpower and hamper the original taste of *kuih bakar*. The sweetness of *kuih bakar* comes from the sweetener. Sweetener is an important ingredient in baking products; besides sweetening the product, it also helps produce a nice flavour, browning, and humectant effects (Zhou et al., 2014). Next, the consumers said they prefer the creamy and rich taste of the balanced mixture of coconut milk and eggs. Egg is an important ingredient in bakery products because of its function as

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an emulsifier, and it also contributes to the richness and flavour of bakery products (Yazici & Ozer, 2021).

***Kuih bakar* traditional's mould which is in frangipani flower shape.** Frangipani flower, also known as plumeria flower**,** is the identity of *kuih bakar*. This traditional shape is being said to be symbolic of *kuih bakar*. If it is in other shapes, they might call it *kuih bingka* because it has almost similar ingredients *to kuih bakar*. According to consumers, *kuih bakar* is special because of its appearance compared to other *kuih*. Other *kuih* is simpler, while *kuih bakar* is in a flower shape with sesame seeds on top. *Kuih bakar* is also said to be beautiful and presentable. Not only that, but the consumers also mentioned that *kuih bakar* is always found during festivities such as Hari Raya and wedding receptions because of its beautiful and presentable appearance. The consumers stated as below:

> *Kuih bakar is different from other kuih. Other kuih look simpler than kuih bakar. Kuih bakar is in flower shape, and then it has sesame seeds on top, which makes it very beautiful and presentable. (FGD1, R6)*

> *The traditional shape of kuih bakar is its identity. The traditional shape, which is a frangipani flower is special, authentic, and original to me. Once you change the shape, I will not recognise it as kuih bakar anymore. (FGD3, R7)*

A well-known phrase often said by chefs is "You eat with your eyes first" (Delwiche, 2012). This phrase fits into the findings of this research, where the shape of *kuih bakar* is deemed presentable and beautiful by consumers. Visual cues such as shape and colour affect the acceptability of foods and

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affect the taste, odour, and flavour of the food perceived by consumers (Hurling & Shepherd, 2003).

Standard size for the mould. The consumers prefer the standard size for the mould of *kuih bakar*. The frangipani flower's mould sold in the market usually comes in three different sizes, with each mould stamped as number 1, 2, or 3 at the back of the mould. The commonly used mould is size 2, which is also considered a standard size by consumers. The size is 18 cm for its diameter and 5 cm for its height. While the size of one petal of the flower's mould is 13.5 cm for the diameter and 3 cm for the height. According to the consumers, one petal fits into their mouth nicely, or in other words, it is mouth-bite size. Not only that, but this standard size is also said to be suitable for any special occasions and festivities as it can be shared with many people. The consumers also said that *kuih bakar* is easily cut because one petal represents a piece of *kuih bakar*. One mould of frangipani flower consisted of 8 petals, so one mould can be cut into eight pieces. The consumers mentioned that:

> *The frangipani flower shape is definitely unique. I always bring kuih bakar to the office's meetings because it's delicious, presentable, and easy to cut. One kuih bakar can be easily cut based on the shape of the petals. (FGD4, R8)*

> *The standard size of kuih bakar is suitable to be shared among family members and suitable for any festivities and occasions. Whenever my family members are at home, kuih bakar is my choice because I can easily cut it based on the shape of the petal and then share it with them. (FGD3, R3)*

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Another consumer stated that one petal fits into her mouth properly. Her statement is as below:

> *One petal of kuih bakar fits into my mouth properly, mouth-bite size. It's easy for me to eat it because it's not too big or too small, it's just nice for me. (FGD1, R10)*

Next, the consumers also stated that they prefer an intermediate-depth size for *kuih bakar*. This is because too thick will make them queasy, and they will also associate it with not being properly baked inside. While too thin will make them feel unsatisfied consuming it. Therefore, intermediate-depth size is considered appropriate and palatable to them. One of the consumers explained:

> *I prefer an intermediate-depth size for kuih bakar because too thick will make me queasy, while too thin will make me unsatisfied. Sometimes, if it's too thick, the inside is not properly baked yet. (FGD2, R1)*

The serving size for each individual is embedded within their environmental factors, such as culture and socio-economic. Individual decisions on the food portion size are also very much related by the socialisation process, and in a highly cultured community, the culturally acceptable serving size is more appropriate to be considered while serving it to the guests (Djupegot et al., 2021).

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Table 4.2 : Consumers' Preferences of the *Kuih Bakar*

Theme	Description
Pandan flavour	• Consumers are familiar with pandan flavour • Masks the eggy taste • Imparts a nice aroma
Light green colour	• *Kuih bakar* is synonyms with green colour, and green is its identity • Deep and intense green colour looks fake to the consumers • Food grade synthetic colouring is acceptable
Intermediate amount of sesame seeds	• Intermediate amount of sesame seeds, so that it will not dominate the overall taste of *kuih bakar*. • Imparts delicious nutty aroma • Adds overall crunchiness to the texture of *kuih bakar* • Sesame seeds are *kuih bakar's* identity, which also makes *kuih bakar* more attractive
Crunchy and a little bit of burnt crust	• Crunchy • A little bit of burnt crust
Soft and chewy texture	• Soft and moist • Chewy and light texture • Variety of experiences while eating, such as crunchy on the outside but soft and chewy on the inside
Creamy and intermediate level of sweetness	• Creamy taste from coconut milk and eggs • Intermediate level of sweetness, as too sweet will make them feel queasy
***Kuih bakar* traditional's mould which is in frangipani flower shape**	• Frangipani flower shape is its identity • Presentable and beautiful
Standard size for the mould	• Suitable for family • Suitable for feast • Bite size after cutting • Intermediate depth size

4.3.2 Consumer Expectations for *Kuih Bakar* Premix Specifications

This sub-topic answers the second research question of consumer expectations for *kuih bakar* premix specifications. This sub-topic consists of eight themes, and each theme has been well explained together with the

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quotation from consumers. There are eight themes in this sub-topic, and the summary has been tabulated in Table 4.3 below.

Maintain the original ingredients. The consumers have requested *kuih bakar* premix to maintain its original ingredients because the original ingredients make *kuih bakar* appear more authentic and tastier. Besides that, if one ingredient is missing from *kuih bakar*, it will not taste as delicious as the original *kuih bakar*. For example, when a baker omits the wheat flour, the outcome of this flourless *kuih bakar* is mushy and not delicious compared to when the ingredients are complete. One of the consumers stated below:

> *All of the ingredients in making kuih bakar are essential because each of the ingredients needs each other to make kuih bakar taste delicious. If one ingredient is missing it will affect the taste. For example, if you do not put any wheat flour into the mixture but only eggs, coconut milk, pandan, and sugar, you will definitely get a mushy kuih bakar because it's flourless. (FGD6, R8)*

The consumers also emphasise the importance of maintaining the original ingredients because they have tasted *kuih bakar* that was made from cow's milk instead of coconut's milk. *Kuih bakar* made from coconut's milk tasted creamier and more delicious compared to cow's milk. A study conducted by Ladokun and Oni (2014), found that coconut milk has the highest fat content than cow milk, goat milk, and soy milk. The fat content is related to the creaminess, and this explains the intense creaminess of *kuih bakar* whenever coconut milk is used as part of the ingredients compared to the other types of milk. The consumers stated below:

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I love kuih bakar because of the creamy taste from the balanced mixture of coconut milk and eggs. There are people who replace coconut milk with cow milk, but cow milk doesn't taste as creamy as coconut milk. So, I prefer kuih bakar which is made from coconut milk. (FGD6, R4)

Please maintain the original ingredients of kuih bakar. I prefer kuih bakar which is made from coconut's milk instead of cow's milk. I found that the original ingredients are the best ingredients to make kuih bakar. It definitely makes kuih bakar more authentic and delicious. (FGD2, R1)

The original flavour of *kuih bakar* is pandan, but there are also several other flavours on the market, such as yam, pumpkin, durian, and corn. Most of the consumers mentioned that, though there are a variety of new flavours out there for *kuih bakar*, at the end of the day, they still prefer pandan flavour the most. They mentioned that the original ingredients make *kuih bakar* appear more authentic and special.

I've tasted several other flavours for kuih bakar before, such as yam and pumpkin, but they don't taste as good as the pandan flavour. So, I still prefer the original flavour for kuih bakar, which is pandan. Please maintain the original ingredients because they make kuih bakar more authentic, besides its shape. (FGD2, R7)

Two pieces of *kuih bakar* from one packet of premix. The consumers suggest that one package of premix be able to produce more than one, which is two pieces. One piece of *kuih bakar* is not as big as the standard cakes sold in the market. So, they feel unworthy to purchase *kuih bakar* premix that is in a small amount per package. Many of them also mentioned that they have a big family, one piece is not enough. One of the consumers stated that:

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The size of kuih bakar is not that big compared to other cakes. I'll suggest that one packet of the kuih bakar premix should be able to produce more than one, or at least two pieces. Not only that, considering that I have a big family, I'll definitely prefer it to be in larger quantities. (FGD3, R3)

The consumers said that they wanted their baking journey of *kuih bakar* premix to be worth it. This is because buying the premix and then baking it requires some of their time and effort. Thus, they hope that they can bake more than one piece, so they feel more valued and worthy. One of the consumers mentioned below:

One piece is not enough considering that I'm going to buy and bake this kuih bakar premix in the oven; these require my effort to make them. So, I feel that at least I have to make it worth it by baking more than one. I think two pieces of kuih bakar are worth it. (FGD4, R10)

Box-packed. The consumers recommended that the premix should be packed in a box. Box-packed foods are more elegant, beautiful, and of higher quality. Furthermore, they mentioned that most of the well-known existing cake premixes in the supermarket are also packed in boxes, so it is important that *kuih bakar* premix can compete with the other cake premix products on the supermarket's shelf. Nørgaard Olesen and Giacalone (2018) found that consumers perceived food in box-packed to be of higher quality than the other types of packaging. This shows a similarity in findings between this study and the previous study. One of the consumers stated below:

…make sure that the outer packge is in box form like the other branded cake premixes. Box-packed food definitely makes premix look more

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beautiful to me. This is important so that kuih bakar premix could compete and be comparable to other premixes on the supermarket's shelf. (FGD5, R1)

Oven as the instrument for baking method. According to consumers, baking using oven is the most suitable kitchen's appliance because it is more user friendly. Oven has temperature and timer settings that consumers can set based on their requirements. These settings have made their lives easier because they can leave the food to be baked inside the oven without worrying it will be over burnt. Most of the consumers mentioned that they have an oven at home, and it is a necessity nowadays to have an oven. According to Cernela et al. (2014), an oven is a common food heating appliance, and it is also significant to be used for baking food products. One of the consumers mentioned that:

Ovens are affordable nowadays. Most households have an oven at home. Baking using the oven is easier than baking using the gas stove because the oven has a timer where we can set the timer without worrying that the kuih will become over burnt. (FGD6, R3)

The consumers also mentioned that the oven is the best compared to other instruments because it can give a crunchier crust for *kuih bakar*. Many of them said that other methods, such as using a pan on the gas's stove for baking, are difficult because it is hard for them to control the baking temperature. Besides that, some of them also said that other instruments such as steamers and microwaves are also not suitable because these instruments cannot

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produce a nice texture and crunchy crust for *kuih bakar*. The consumer explained below:

> *Oven baking is the most suitable method because you can set the temperature and timer for the oven. These settings will help kuih bakar to cook properly inside and out. Not only that, kuih bakar will have a very nice crust by using the oven too. If you use the microwave, I doubt that it can produce a nice crust. (FGD3, R6)*

Baking time of 30 to 50 minutes. The consumers mentioned that they expected *kuih bakar* premix would have the standard baking time like the other cakes, which is around 30 to 50 minutes using the oven. Oven is a common baking appliance used in food preparation because it is more efficient compared to other appliances (Mistry et al., 2006). Many of the consumers have experienced baking before, so they do not have much problem waiting for the cake to be baked in the oven since they can relax while waiting for it to be ready. Some of them mentioned that they usually fill up the time with doing other things, such as house chores. One of the consumers stated that:

> *I'll suggest around 30 minutes for the baking time; usually it takes me around 30 to 50 minutes to bake a cake. I would expect the same for kuih bakar premix. While waiting for it to be baked, I always fill up my time doing other house chores. (FGD5, R9)*

Similar to the scratch-made *kuih bakar.* The consumers demand *kuih bakar* premix's output to be almost the same as the one made from scratch. Many of them have experienced buying and baking cake premix that is good. Therefore, they expected that *kuih bakar* premix would have an excellent output too. However, there are also cases where other cake premixes do not

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turn out gas well as they expected. It depends on the brand; usually, the well-known branded premix gives them a good result. The consumers mentioned below:

> *Kuih bakar premix is easy to make. If it's easy, people will definitely be interested in buying. Most importantly, the taste and texture of the kuih bakar premix need to be the same as the scratch-made kuih bakar. I think people will definitely be interested in buying it; even the instant noodle has its fan, so I think in the future kuih bakar premix too. (FGD4, R7)*

> *I've tried making brownies from premix before, and they taste delicious. It's difficult to get a tasty kuih bakar nowadays, but I will definitely be interested in trying if I have a chance to make a kuih bakar premix that tastes as good as the scratch-made one. (FGD4, R1)*

Price of less than RM10 per box (2 pieces per box, RM5 per piece). The consumers expected that the price of *kuih bakar* premix would be less than RM10 because they usually perceived a price of more than RM10 to be expensive. Generally, the market price for cake premix is around RM10; hence, they expected almost the same price for *kuih bakar* premix. They also mentioned that the price should not to be too cheap or too expensive. This is because if it is too cheap, they will associate it with low quality, while if it is too expensive, it will make it unaffordable to them. They perceived RM10 to be a reasonable price and also value for their money considering that they would receive two pieces of *kuih bakar* from one packaging, which indicates that RM5 per piece. Consumers price expectation of a food product will determine their satisfaction with the purchased product, thus the possibility of repeated purchase (Grunert, 2002; Roy et al., 2019). The consumers stated below:

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The price must not be too cheap, but also not too expensive. Normally, the price of cake premix in the supermarket is around RM10. So, I'll suggest the price of kuih bakar premix be below RM10. (FGD5, R7)

If the price is RM10, it is still reasonable to me, considering that I will get two kuih bakar from the premix. Usually, my perception is that if it's more than RM10, I will assume it's expensive. (FGD6, R2)

One year of shelf's life. The consumers suggested that the shelf's life of *kuih bakar* premix to be one year because, usually, that is the shelf's life of other cake premixes that they bought in the supermarket. They have an assumption that the shelf's life of more than one year will be of less quality if it is kept for too long. This is because they have experienced having flour and premixes that had small bugs, such as weevils, after storing them for too long. The usual suggested shelf life for flour by the producers ranges from 9 to 15 months. However, the actual shelf life of flour depends on the temperature and humidity of the storage (Doblado-Maldonado et al., 2012). One of the consumers stated that:

One year of shelf's life is sensible to me; it's weird if the premix has too long of shelf's life. Furthermore, I have a bad past experience with premix that I have kept for too long, where there are small bugs inside and it smells stinky. (FGD4, R8)

Some also mentioned that they usually do not have any problems with the shelf's life of premix because they buy the premix with the intention to bake it, so rarely does it reach the expiration date. One of the consumers mentioned below:

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I don't really mind whether the shelf's life is long or not because I usually buy the cake premix with the intention of baking it right away. I hardly keep it long at home. I would expect the shelf's life of kuih bakar premix to be around one year, just like the other available premixes on the market. (FGD6, R2)

Table 4.3 : Consumer Expectations for *Kuih Bakar* Premix Specifications

Theme	Description
Maintain the original ingredients of *kuih bakar*	• The original ingredients make *kuih bakar* appear more authentic and delicious.
Two pieces of *kuih bakar* from one packet of premix	• The consumers feel more worthy to purchase *kuih bakar* premix that produces two pieces of *kuih bakar* per packaging.
Box-packed	• Looks more elegant so that it can compete with other branded cake premix in the supermarket.
Oven as the instrument for baking method	• Oven is user friendly • Only oven can produce crunchy crust for *kuih bakar*
Baking time of 30 to 50 minutes	• The consumers expected *kuih bakar* premix to have the standard baking time just like the other cakes, which is around 30 to 50 minutes.
Similar to the scratch-made *kuih bakar*	• The taste and texture of the *kuih bakar* premix need to be the same as the scratch-made *kuih bakar.*
Price of less than RM10 per box- (2 pieces per box, RM5 per piece)	• The consumers requested that the price of *kuih bakar* premix be less than RM10 per box, because they usually perceive prices of more than RM10 to be expensive.
One year of shelf's life	• One year of shelf's life is sensible to the consumers. This is because they have an assumption that a shelf's life of more than one year will be of less quality if it is kept for too long.

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4.3.3 Consumers' Opinions Regarding the Viability of *Kuih Bakar* Premix as a Product

Kuih bakar premix is a totally new product on the market, where the consumer just needs to mix water with the premix flour and then bake in an oven. Many other premixes on the market require consumers to add eggs, milk, and butter to their premixes. These are not too convenient; in other words, they still have to buy other ingredients to make the cake. Hence, the researcher asked the consumers regarding their opinions about *kuih bakar* premix. There are eleven themes in this sub-topic, and the summary has been tabulated in Table 4.3 below.

***Kuih bakar* premix is not available on the market yet.** The consumers said that they have hardly seen Malay heritage *kuih* in premix form. They frequently found the western and modern cake premixes on the supermarket's shelf. There are quite a number of Malay traditional foods in frozen form nowadays, such as *karipap*. However, they also said that *kuih bakar* in frozen form is hardly seen either, though there are some small entrepreneurs selling it from home. One of the consumers stated that:

> *I've hardly seen any Malay traditional cake premixes in the market. I usually find western cake premixes such as chocolate cake, brownies, and muffins on the shelves. Even I have hardly seen any kuih bakar in frozen form too. (FGD2, R10)*

Premix is a better product compared to the frozen product. The consumers mentioned that premix is of better quality among other instant products, especially frozen products. Surprisingly, many of them had bad past

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experiences with traditional frozen food products. They have experience buying and cooking traditional frozen foods due to the fact that there are quite a number of companies selling them in the frozen section of the supermarket. They mentioned that they had bad experiences with frozen food such as frozen *karipap*, where the fillings were already sour and stale, probably due to either mishandling of frozen temperatures by the consumers or the retailers. Not only that, but they also said that sometimes when they fry the frozen *karipap*, the texture breaks and deforms during frying. The taste and texture are not up to their standard either. Thus, these past experiences have made them perceive frozen food to be of low quality. The consumers explained below:

> *I have a mindset where I always associate frozen food with low quality. I don't feel it's appetising, and it's also not of good quality. I had bad past experiences with frozen food, and I think that is why I have that kind of mentality. (FGD1. R8)*

> *Buying frozen foods depends on your luck. Sometimes it tastes good, but sometimes not. There are times where I buy frozen food, such as frozen karipap, where the fillings have turned sour and stale. Then, when I fry it, the shape deforms and breaks up until all of the fillings are scattered around in my frying pan. With these bad experiences, I gave up buying frozen karipap. (FGD6, R9)*

However, the consumers mentioned that they had good experiences baking premix cake products. Though there are cases where some of the premix cakes do not taste tasty to them. Nevertheless, they do not have to worry regarding the frozen temperature of the products, such as mishandling of the temperature. Malaysia is a tropical country with a hot and humid climate all

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year round; thus, mishandling of frozen temperatures is quite common among consumers. Food supply chains, especially the cold chains, usually face problems in maintaining the cold and frozen temperature of food products from the field to the consumer. This problem involved the qualities of the food products; hence, food deterioration in frozen foods is common if corrective measures are not taken seriously (Zanoni & Zavanella, 2012). According to the consumers, premix is kept at room temperature, so it is easy for them to handle and keep it safe at home. They also mentioned that premix has a great reputation because they usually have good experiences baking them. Some of them mentioned that premix from a well-known brand usually has a better taste and texture. One of the consumers stated that:

> *I've baked brownies from the premix before; it tastes good and are delicious. It's easy to make, and I'm happy with the results. Well, I think if it's difficult to get a tasty ready-to-eat kuih bakar in the market, why not just bake it from the premix. It's convenient for me too. (FGD4, R1)*

In line with the current trend. The consumers said that the *kuih bakar* premix is in line with the current trend because nowadays, there are many convenience food products on the market. Convenience foods are one of the huge trends in the food business, and the demands for them is steadily increasing (Brunner et al., 2010). According to the consumers, convenience food helps career women; they said that it has made their lives easier. Not only that, whenever they are busy, even the men, such as their husbands and children, can prepare their foods using convenience food products. Convenience food products are not too complicated to prepare as compared to scratch-made food. One of the consumers explained that:

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As a career woman, I appreciate convenience food products. Most of my friends are career women too, and currently, there are many convenience food products on the market that do make our lives easier. So, in my opinion, kuih bakar premix is in trend with the current food market. (FGD4, R8)

The consumers also explained that *kuih bakar* premix is in line with the current trend because it only requires an oven to bake. Most of them own modern appliances at home, such as ovens and microwaves, so they do not think there is any problem for them to bake *kuih bakar* premix. The traditional cooking method is not relevant to be used now, as they said that it is not applicable to their current lifestyles. One of the consumers stated that:

Convenience food products such as kuih bakar premix are in line with the current trend. For example, previously, our ancestors used charcoal and coconut coir as the cooking stove, but nowadays, we have many modern appliances in the kitchen, such as an oven. I think it is not relevant to use the traditional method to cook anymore. Furthermore, it's difficult to find coconut coir, and I live in an apartment's house, definitely this old method is not suitable or applicable to me. (FGD5, R8)

Can alter to preferred taste. *Kuih bakar* premix is consumers' choice because they can alter the premix based on their likings. They prefer premix compared to other instant products because they can adjust and increase the level of sweetness, creaminess, and chewiness just by adding more sugar, coconut milk, and flour to the premix mixture. Not only that, they can also add any toppings that they like on top of the mixture. Besides that, they also mentioned that they could adjust the crunchiness of the *kuih bakar* according

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to their preference by adjusting the time and temperature of their oven. Many aspects of the premix can still be adjusted and altered based on their preferences before the *kuih bakar* premix is baked in the oven. The consumers explained below:

> *Premix cake is easy to make, I just love the fact that I can alter the mixture according to my preference. For example, I can add more sugar if the premix is less sweet. I can also add any toppings of my choice. (FGD5, R8)*

> *I prefer premix because, when I compare it with frozen food, for premix I can mix the mixture myself, so it depends on whether I want it to be crunchy or less crunchy. I can definitely adjust the oven's temperature depending on my liking. But, for frozen foods, I cannot alter the taste according to my likings because it's already done, and I can just reheat it inside the microwave. (FGD1, R9)*

Hygienic. The consumers mentioned that premix food is more hygienic and cleaner compared to ready-to-eat (RTE) food. The consumers were concerned about the cleanliness of the RTE food sold in the market. They were concerned about the food safety; some said that the RTE food sold in the streets and markets is sometimes unhygienic, such as in *pasar malam*, because the food is much more exposed to dust. Some also said that they have a weak body with a low immune system, so they prefer preparing the food themselves. A study conducted by Raza et al. (2021), found that 38% of RTE food sold in the streets was unfit for human consumption due to microbial contamination. So, premix food is a good choice for consumers as they can control and maintain the cleanliness of the food that they prepare at home. One of the consumers stated that:

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I like kuih bakar, but traditional kuih is usually sold in pasar malam. So, my concern is regarding food safety. I have a low immune system, my stomach is quite weak, and I tend to get food poisoning whenever I consume foods from there. I think this is because some foods are exposed to dust and also mishandled by the sellers. For premix food, I feel safer and more hygienic because I can prepare it myself at home. (FGD3, R7)

Same outcome as the scratch-made one. Many of the consumers said that they were not really good bakers. There are times when their scratch-made cake turns out great, but there are also times when it does not turn out as well as they expected. So, they prefer to use premix because the output of the premix is the same as the scratch-made one, and it also tastes delicious. One of the consumers stated that:

I have five kids at home, and they love eating doughnuts. As a career woman, I'm always making doughnuts from premix. It's super easy; I just need to add yeast and water to the dough. My kids love it because the doughnut premix gives the same outcome as the scratch-made one and tastes good. (FGD5, R4)

The consumers also said that they have a very high interest in baking, but they always fail at it, which sometimes makes them demotivated to bake. However, with premix, anyone can bake because it is easy and does not require any baking skills. Furthermore, it also gives them the same output as the scratch-made one, sometimes even better. One of the consumers explained below:

I have a very high interest in baking, but I always fail at it. Maybe because I don't have the skills. So, by using cake premix, the output of

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the cake turns out to be the same as the scratch-made one, and it does taste delicious too. (FGD3, R10)

Taste delicious. Consumers said that the outcome of the cake premix that they usually buy is good and also tastes delicious. So, they expected the *kuih bakar* premix to taste good too. Previously, the traditional *kuih bakar* was tasty and delicious, but nowadays it is hard to find a tasty *kuih bakar* in the market. Some of them mentioned that they tasted a good and delicious *kuih bakar* only in their hometown, which is in the *kampung*. One of the consumers mentioned that:

I usually find delicious kuih bakar in the kampung. So, whenever I have the chance to go back to kampung, I'll definitely buy it there. (FGD3, R1)

The consumers also said that *kuih bakar* made by the old generations, such as their grandmother and great-grandmother tastes delicious, and it was the last time, they ever tasted a tasty *kuih bakar*. This is because their grandmother and great-grandmother had passed away, and they never had the chance to learn to make it. They also said that with all the data that the researcher had collected, the researcher could develop a delicious *kuih bakar* based on consumers' preferences. Hence, *kuih bakar* premix is a good alternative for a delicious *kuih bakar* since it is hard for them to find a tasty *kuih bakar* nowadays. One of the consumers stated that:

I've tasted kuih bakar made by my late grandmother; it tastes delicious. Nowadays, it's difficult to find a tasty kuih bakar in the market, usually, it's not up to my preferences, such as if the texture is too hard. I think

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the seller is trying to cut costs by reducing the amount of coconut milk and eggs, so the taste is also not creamy at all. (FGD6, R7)

Mass production for ready-to-eat (RTE) food industries. The consumers mentioned that *kuih bakar* premix could be used and benefit the food manufacturing and catering industries. Some of them had experience working in the food manufacturing and catering industries. They said that the food industry nowadays prefers to use premix because it is easier and also because it gives them a consistent end product. In other words, the output is always the same in terms of taste, texture, colour, size, and many more. The consistent end product has saved their production costs, especially when producing in large quantities. One of the consumers explained that:

I've worked with a food manufacturing company before, the company produces RTE food. The company uses premix for their muffins because it's easy. Premix doesn't require a lot of ingredients, and the output, such as the taste and texture, is always standardised too. In my opinion, kuih bakar premix can also be used for mass production in industries such as food manufacturing and catering. (FGD3, R6)

Another consumer stated that:

My daughter supplies chocolate cupcakes every day to the school's canteen. So, I always help her make cupcakes on weekends. We used cupcake premix because it's easier, tastes delicious, and always gives us consistent results. Besides that, when we calculated the costs, it's much cheaper to produce cupcakes using the premix than a scratch-made one. I think kuih bakar premix can also be used by the caterer for mass production (FGD5, R7)

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International market. The consumers said that *kuih bakar* premix is suitable to be marketed internationally because it is convenient and tasty. Besides that, *kuih bakar* is not spicy compared to other Malay traditional foods, so it can be accepted globally, especially for international citizens who do not favour spicy foods. As globalisation progresses, many international foods are well-accepted by global consumers. Global consumers have become more open-minded towards other ethnic foods and cultures (Yang & Lee, 2019). According to consumers, *kuih bakar* premix is easy to handle, carry and transport globally because of its nature. This is because it is in dried form, has a light weight, has a long shelf life, and only requires room temperature for storage. All these advantages have made *kuih bakar* premix have a very good potential to be marketed internationally. Furthermore, it can be one of the country's sources of income once it is promoted and sold internationally. One of the consumers stated that:

> *From my perspective, currently, we've been adapting and eating the westerner's food as part of our lifestyles, such as having pancake premix for breakfast. I think we accept eating pancake premix because it's easy to make and also, it's delicious. So, I think why not promote our premix foods internationally so the world knows our identity and culture. It can also generate and increase the economy. (FGD3, R5)*

Some also mentioned that, whenever they went overseas, be it for studying, working, or holidays, they always craved for Malaysian foods. Hence, premix foods are said to be a good option for them to overcome their cravings. One of the consumers explained that:

> *I've lived abroad for eight years. When I was abroad, I always craved Malaysian foods. In my opinion, if kuih bakar premix is available*

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overseas, it can definitely curb the cravings of Malaysians. Not only that, I also think kuih bakar premix is suitable to be marketed internationally because of its great conditions, such as being lightweight, which makes it easy to be sold anywhere around the world. (FGD1, R8)

Convenient. The consumers highly emphasised that *kuih bakar* premix is convenient to them. Therefore, the researcher had sorted out the main theme, which is **convenien**t, into two sub-themes that are **easy to make** and **all-in-one**. 'Convenience foods' is a popular word search on the internet, this shows that people generally have a high interest in convenience food products. They also relate convenience to time and skills (Scholliers, 2015).

Easy to make. The consumers mentioned that the *kuih bakar* premix is convenient because it is easy to make compared to the scratch-made *kuih bakar*. Scratch-made *kuih bakar* is tedious because traditionally, the ingredients such as *pandan* leaves and coconut milk, need to be crushed and pressed manually from the fresh plants. These processes are difficult, tiring, and consume a lot of time, especially for career women. While the *kuih bakar* premix is super easy to prepare and saves a lot of time because they only need to mix the premix with water and then bake. *Kuih bakar* premix is also said to be suitable for a busy person; in other words, it caters to busy lifestyles. According to Buckley et al. (2007), consumers always associate convenience with time, physical energy, and mental effort savings; in other words, foods that are easy to prepare. One of the consumers stated that:

As a career woman, I'm at work from Monday until Friday. So, I only have the weekends to rest. I don't have the desire or that much energy

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to make difficult food. So, I definitely choose convenience foods over scratch-made ones. In my opinion, kuih bakar premix is easy to make and also saves up a lot of time, which I can use to rest and relax at home with my kids. (FGD5, R1)

All-in-one. The consumers have given very positive feedback regarding making an all-in-one *kuih bakar* premix, which they just need to add water into the premix and then bake. It is definitely very convenient compared to other premixes, where they still need to purchase the added ingredients, which are fresh eggs and milk. One of the consumers stated that:

Kuih bakar premix is very convenient because it's all-in-one. I don't have to purchase any ingredients anymore, and I just need to add water to the premix and then bake. While the other cake premixes that I always bought are more complicated because I have to add other ingredients such as eggs and milk. It's not that convenient to me when I've still got to purchase other ingredients in the market just to make the premix cake. (FGD6, R4)

Surprisingly, many of the consumers also mentioned that they always have problems with the fresh eggs. It is troublesome for them to purchase fresh eggs because they have a short shelf life. Thus, they cannot keep it long at home. One of the consumers stated that:

I'm quite lazy to buy any extra ingredients for the premix, such as fresh eggs. Fresh eggs have a short shelf life, so it's kind of inconvenient for me to go out of my house to just purchase fresh eggs every time I want to bake a premix cake. So, I would love to have an all-in-one kuih bakar premix, to which I just need to add water and bake. (FGD5, R10)

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Besides that, some of them also mentioned that fresh eggs have different volumes for each of the eggs, though the premix's manufacturer already stated the egg's grade required for the mixture. They still think that the volumes are not the same for each of the eggs that they purchased. Hence, it affects the output of the premix product that they baked. One of the consumers explained below:

> *All-in-one kuih bakar premix is a good idea because I hate dealing with fresh eggs while baking premix. I'm always having problems with fresh eggs because I find that every time I bake using them, it gives me an inconsistent end product. I think it's because fresh eggs have different volumes and different qualities for each of the eggs. (FGD5, R8)*

Help to sustain the heritage food. The consumers greatly mentioned that *kuih bakar* premix could be a medium to help sustain the heritage food. The researcher had sorted out the main theme, which is **help to sustain the heritage food,** into two sub-themes, which are **help to preserve the *kuih bakar* identity** and also the **Malay identity.** Heritage food is related to the cultural and ethnic identity. Hence, sustaining the heritage food could lead to sustaining the cultural and ethnic identity too (Almansouri et al., 2021b).

Help to preserve the *kuih bakar* identity. According to the consumers, it is difficult to find *kuih bakar* in the market, even in *pasar malam* and *pasar tani*. *Kuih bakar* premix could help preserve the identity of *kuih bakar*, because *kuih bakar* premix is readily available in the market, and they can bake the premix whenever they want. The consumers mentioned that most old generations know how to make *kuih bakar*, they have watched their grandmother make

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kuih bakar from scratch, but they never had the chance to learn how to make it. But if they were going to learn to make it now, that old generation had already passed away. One of the consumers stated that:

> *The last time I'd eaten a delicious kuih bakar was during secondary school. It was sold in pasar tani in my village. But now it's hard to find any kuih bakar in the market, even in pasar. I think only the old generation knows how to make it, and most of them have passed away. So, I think kuih bakar premix does help in preserving the kuih bakar identity because it's easy and very convenient to make. (FGD6, R2)*

Many of the younger generations did not know some of the traditional *kuih*. They are more likely to buy whatever is convenient and easy for them. So, it is said that *kuih bakar* premix could help in preserving its identity, which means that is at least the young generation knows the appearance and taste of *kuih bakar*. One of the consumers mentioned that:

> *As a young generation, I agree that having kuih bakar premixes in the market, does help in preserving the kuih bakar identity. At least the young generation knows how kuih bakar looks and tastes. People are busy nowadays, we don't have time to prepare the traditional kuih, so by having this premix, I think people will choose to buy it, hence, of course, if it continues, definitely kuih bakar will not go extinct. (FGD6, R3)*

Malay identity. Many consumers mentioned that *kuih bakar* is usually found during Malay festivities, such as during Hari Raya and wedding events. Not only that, they also mentioned that *kuih bakar* always reminds them of their hometown in *kampung*. These explain that *kuih bakar* is part of the Malay

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identity and that its existence has a significant impact on the lives of the Malays. One of the consumers stated that:

> *Kuih bakar is always available during any festivities in my hometown, which is in the kampung. Whenever I have the chance to go back to kampung, I will definitely purchase kuih bakar there. (FGD1, R1)*

The consumers also stated that Malay heritage foods are part of the Malay identity. If the Malays do not sustain their heritage foods, they will definitely slowly diminish and, lastly, become extinct. It is the duty of the Malays to sustain it, and one of the ways is by developing convenience heritage food products such as *kuih bakar* premix. One of the consumers mentioned that:

> *We need to sustain our heritage foods because, without them, we're definitely going to lose our identity as Malay. If we do not sustain and take any action now, the younger and future generations will not recognise the heritage foods. (FGD2, R1)*

The consumers also mentioned that Malay heritage foods are unpopular nowadays, especially among the younger generation, because there are not many convenience heritage foods on the market. According to them, there are various choices of convenience western and modern foods compared to heritage foods. The heritage foods are too difficult to make from scratch; hence, they settled for convenience foods that they could find around them. RTE heritage foods are difficult to be find in this day and age; hence, the younger generations are more likely to buy whatever is available around them in the nearest supermarket (Hamzah et al., 2015). One of the consumers explained:

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We're living in a modern era where everything requires us to be fast, and we need convenience products to help us. From my observations, the parents love feeding their kids convenience foods such as frozen nuggets and sausages. This is because these foods are easy to prepare; hence, their children were rarely fed with heritage foods because there are not many convenience heritage foods on the market. In my opinion, if heritage convenience foods are readily available on the market, such as kuih bakar premix, the kids will be familiar with heritage foods, and definitely, the image and identity of heritage foods could be sustained. (FGD2, R10)

Table 4.4 : Consumers' Opinions Regarding the Viability of *Kuih Bakar* Premix as a Product

Theme	Description
***Kuih bakar* premix is not available on the market yet**	• The consumers said that they have hardly seen Malay heritage *kuih* in premix form.
Premix is a better product compared to frozen product	• The consumers mentioned that premix is of better quality than frozen products because they had bad past experiences with frozen food products.
In line with the current trend	• *Kuih bakar* premix is in line with the current trend because nowadays, there are a lot of convenience food products on the market.
Can alter to preferred taste	• Many aspects of the premix that they can still adjust and alter based on their preferences, before *kuih bakar* premix, are baked into the oven.
Hygienic	• The consumers mentioned that, premix food is a good choice, because they can control and maintain the cleanliness of the food that they prepare at home.
Same outcome as the scratch-made one	• Consumers prefer to use premix because the outcome of the premix is the same as the scratch-made one, sometimes even better.

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Table 4.4 : Continued

Theme	Description
Taste delicious	• *Kuih bakar* premix is a good alternative for a delicious *kuih bakar* since it is hard for consumers to find a tasty *kuih bakar* nowadays.
Mass production for RTE food industries	• The RTE food industries nowadays prefer to use premix because it is easier and also because it gives them a consistent end product.
International market	• The consumers said that *kuih bakar* premix is suitable to be marketed internationally because it is convenient and also tasty.
Convenience **Sub-themes:** **i. Easy to make** **ii. All-in-one**	• The consumers mentioned that *kuih bakar* premix is convenient because it is easy to make compared to scratch-made *kuih bakar*. • *Kuih bakar* premix is an all-in-one product, so it is definitely very convenient compared to other premixes, for which consumers still need to purchase added ingredients.
Help to sustain the heritage food **Sub-themes:** **i. Help to preserve the *kuih bakar* identity** **ii. Malay identity**	• *Kuih bakar* premix could help in preserving its identity, which is that at least the young generation knows the appearance and taste of *kuih bakar*. • The consumers also stated that Malay heritage foods are part of the Malay identity. If the Malays do not sustain their heritage foods, they will definitely slowly diminish and, lastly, become extinct.

4.4 Chapter Summary

FGD is a good medium in qualitative research when a large number of samples are needed for the data collection. Hence, by conducting FGD, the researcher was able to conduct FGD sessions with 62 consumers (n = 62). This is essential because it helps to understand consumers better. In this chapter, the researcher wrote and shared the findings, including the answers to all of the research questions. Some of the findings indicated that consumers

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preferred pandan flavour, light green colour, soft and chewy texture, and also a creamy and intermediate level of sweetness for *kuih bakar*. In addition, consumers demand *kuih bakar* premix characteristics; in box packaging, two pieces of *kuih bakar* from one packet of premix to maintain the original ingredients, and a baking time of 30 to 50 minutes.

Lastly, the consumers were asked about their opinions of the *kuih bakar* premix. They mentioned that *kuih bakar* premix is in line with the current trend, can be used by RTE food sellers, including food manufacturers, has a high potential to be marketed internationally, is convenient, and helps sustain heritage food. The findings obtained in this chapter were triangulated with the data obtained from the *kuih bakar* sellers and elaborated in Chapter 5. The data obtained from the FGD sessions with consumers and in-depth interviews with the sellers was applied to develop the *kuih bakar* premix in Chapter 6. In conclusion, in this chapter, the researcher explored and understood the consumers' preferences, expectations, and opinions of *kuih bakar* premix. This is important so that the researcher can develop a good product based on the requirements suggested by the consumers

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CHAPTER 5

DISCOVERY ON THE CHALLENGES IN MAKING *KUIH BAKAR* BASED ON EXPERTS' EXPERIENCES AND THEIR OPINIONS OF *KUIH BAKAR* PREMIX

5.1 Introduction

The experts in making *kuih bakar* are the *kuih bakar* producers who make *kuih bakar* daily for their living. These are the people who know by heart the difficulties and challenges of making *kuih bakar*. Hence, by understanding these problems, the researcher can develop a better *kuih bakar* premix compared to the conventional way of making *kuih bakar*. The researcher has also asked the producers' opinions regarding the idea of developing premix for *kuih bakar.* This chapter also helps the researcher better understand consumers and producers on a deeper level. Many questions asked in this chapter help to deepen the data obtained in the previous chapter, validate, triangulate, and also make the data more rigorous for this whole research.

5.1.1 Objective

To discover the challenges in making *kuih bakar* based on producers' experiences and their opinions regarding *kuih bakar* premix.

5.1.2 Research Question

What are the challenges in making *kuih bakar* based on producers' experiences and their opinions regarding *kuih bakar* premix?

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5.2 Methods

The method employed in this particular chapter is an in-depth interview in order to obtain detailed answers to all of the research questions that arise above. Six *kuih bakar* producers (n = 6) were interviewed in the in-depth interview sessions from April 2019 until May 2019. The interview sessions last for around 40 to 60 minutes each. The number of participants stop at the sixth interviewees due to data saturation. The term "data saturation" describes the stage of data collection at which issues start to repeat and additional data collection becomes redundant (Hennink et al., 2019).

The *kuih bakar* producers are known as experts in this research because they are the people who make *kuih bakar* daily for a living. The researcher is not only interviewing them as producers but also as experts since many of the research questions that arise in this chapter focus on the challenges and their opinions. The researcher wanted to understand the difficulties of making *kuih bakar* so that the researcher could develop a better product, tackling the challenges and issues that the sellers have to face in making *kuih bakar* from scratch.

The *kuih bakar* producers were recruited based on the snowball technique, which the researcher had started looking for suitable *kuih bakar* producers during the FGD sessions previously. FGD participants were asked about particular sellers that they know that make delicious and good *kuih bakar*. Next, the internet, such as Google, and social media platforms, such as Facebook and Instagram, were used to find suitable respondents. Specific

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keywords such as #kuihbakar, #kuihbakarpandan, #kuihbakarbijan, and #kuihbakarkemboja on Instagram and also on Facebook were used to find the users who put these keywords on their profiles for their businesses. The researcher also searched for *kuih bakar* sellers on Google by reading the Google reviews and recommendations of popular *kuih bakar* shops. After contacting them through all these methods, an appointment was set up with the respondents once they agreed to be interviewed.

Prior to starting the interview session, a detailed explanation was given regarding the purpose, procedures, risks of participation, and confidentiality of the respondents. All this important information was written in a 'consent form' where they needed to put their signature in that form as an agreement between the interviewer and the producers. A token of appreciation was also given at the end of each interview session to appreciate the time and effort given by the producers.

The data was collected using the professional audio recorder (Remax IP1) and a handphone recorder (iPhone) as a backup. The data were transcribed and analysed after each interview session so that the researcher could roll the interview guide for the next sessions until it reached the saturation point. The researcher had applied the probing techniques during the interview sessions so that the researcher could dig deeper into understanding the sellers. Hence, deeper data could be obtained for this research. All the data obtained was managed by the NVivo 12 software. The data were analysed using thematic

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analysis techniques. Each theme was included together with the quotations as a strong justification and proof of the research conducted in this chapter.

Through the use of standardised methods for conducting consumer focus groups and in-depth interviews, this qualitative research study maintains reliability by ensuring uniform data gathering and analysis techniques. Replication is made possible through open documentation of the study process, which further increases reliability. Triangulation, which involves merging many data sources, methodologies, and viewpoints to confirm conclusions, ensures validity. The credibility of the study is increased through developing rapport, using open-ended questions, and utilising member checking. The combination of scientific analysis methods with social science methodologies enhances validity by providing a thorough grasp of the research topic.

5.2.1 Demographic Profiles of Respondents

Six *kuih bakar* producers (n = 6) were interviewed, of whom five are female and one is male. Their age range is between 40 to 60 years old. All of them have experienced making *kuih bakar* for living for more than five years. Five years of experience in making the same type of foods can be seen as noteworthy in the context of culinary abilities and competence, particularly if the person has regularly participated in the practice and has developed a thorough understanding of the recipe, ingredients and procedures (Haddaji et al., 2017). Their business's location is located in Klang Valley areas due to its high population density and varied demographic. Furthermore, the food and

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beverage sectors, which include both conventional food markets and contemporary retail establishments, are highly concentrated in Klang Valley, a major economic centre (Ramli et al., 2016).

5.3 Results and Discussion

There are three main sub-topics written on this topic. Each sub-topic represents a research question. The data for the first research question was written and shown in the first sub-topic, followed by the next research question subsequently below. The data that emerged from each research question was summarised in table form at the end of each sub-topic.

5.3.1 Producers' Reasons for Selling *Kuih Bakar* for Living

The respondents were the experts in *kuih bakar* making. They had answered the first research question, which is the reasons for selling *kuih bakar* for living in this sub-topic. Researcher would like to know the reasons for selling *kuih bakar* instead of other *kuih*. Three themes emerged from the data gathered for this particular research question. The themes emerged show that there is apparent market potential for *kuih bakar*. Below are the detailed explanations, together with the quotations from the experts. The summary of this sub-topic is tabulated in Table 5.1 below.

High interest in baking Malay *kuih.* All the respondents had mentioned that they started selling *kuih bakar* because they had a high interest in baking Malay *kuih*. A study conducted by Haddaji et al. (2017) found that high interest and passion in cooking are determinants of success in the food business. In

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this study, the *kuih bakar* producers are Malay bakers, and most of their products are Malay traditional *kuih* and cakes. They had learned to make *kuih bakar* from baking teachers, magazines, and also from recipes on the internet. The producers stated that:

> *I obtained the kuih bakar recipe from a magazine a long time ago. Not only that, I've also asked many people for tips on how to make a delicious kuih bakar. (R1)*

> *I've learned to make kuih bakar from a teacher through an online learning platform on the Facebook page. She teaches me one-by-one how to make kuih bakar. (R4)*

However, all of them said that though they had the original recipes, the output was not as they expected for the first time making *kuih bakar*. They all mentioned that they had adjusted the ingredients and techniques and practised making *kuih bakar* many times before getting the right recipes. One of them mentioned that:

> *Actually, it's not easy for me to become a master in kuih bakar making because you need to know the right portion for each ingredient, including the techniques. So, to master these, I've practised making kuih bakar so many times before, including adjusting and readjusting the ingredients, baking time, and temperature. (R3)*

***Kuih bakar* is liked by all generations.** One of the reasons the producers choose to sell *kuih bakar* is because *kuih bakar* is liked by all generations and many other races besides the Malay. They stated that, though *kuih bakar* is a traditional food, it is not only favoured by the old generation but also by the

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young generation once they taste it. So, *kuih bakar* is one of the traditional *kuih* that is sellable, according to them. One of the experts mentioned that:

> *Nowadays, there are not many sellers selling traditional kuih, such as kuih bakar, but actually, this kuih is a sellable kuih. I have many customers from different generations and also from different districts. I also have a Chinese customer from another district who frequently comes to my shop to purchase my kuih bakar. (R1)*

High demand for *kuih bakar* by consumers. According to the producers, *kuih bakar* is always in high demand by consumers, especially for wedding events and during any festivities. The sellers stated that the consumers would like to have *kuih bakar* and other traditional *kuih* at their wedding and at any other religious and cultural events. Not only that, but they also have consumers ordering *kuih bakar* for birthday events and also for office meetings. A study conducted with consumers by Guerrero et al. (2009) found that traditional food is also associated with seasonal food eaten during special celebrations such as Christmas and Easter. This finding correlates with the findings in this sub-topic. One of the producers stated below:

> *I'm not only selling kuih bakar for daily consumption here, but I've also received many orders for wedding events. They wanted to make kuih bakar as door gifts for each of their guests. Some of them even make kuih bakar as a dowry's gift for their solemnization. (R5)*

The producers also mentioned that there is no specific time to eat Malay *kuih*. Malay *kuih* can be eaten all day. Hence, the producers said that the Malay *kuih* could be eaten daily, and many of the Malays consume *kuih* every day,

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especially during breakfast and teatime. So, the producers said that *kuih bakar* is in demand every day. One of the producers mentioned below:

> *Kuih bakar and other Malay kuih are sellable daily because the Malays eat kuih every day, all day, as long as they want to consume it. So, this explains one of the reasons I choose to sell kuih bakar. Kuih bakar is in demand by customers. (R3)*

Table 5.1 : Producers' Reasons for Selling *Kuih Bakar* for Living

Theme	Description
High interest in baking Malay *kuih*	• All of the respondents mentioned that they started selling *kuih bakar* because they had a high interest in baking Malay *kuih*.
***Kuih bakar* is liked by all generations.**	• One of the reasons experts choose selling *kuih bakar* is because *kuih bakar* is liked by all generations and many other races besides the Malay.
High demand for *kuih bakar* by consumers	• According to the experts, *kuih bakar* is always in high demand by consumers, especially for wedding events and during any festivities.

5.3.2 Challenges in Making *Kuih Bakar* according to the Producers

The producers had answered the second research question, which is the challenges in making *kuih bakar* in this sub-topic. Five themes emerged from the data acquired from this particular research question. The producers had explained in detail the challenges, and their quotations were also included. The summary of this sub-topic is summarised in Table 5.2 below.

Raw materials problems. The producers mentioned that they were facing problems with the raw materials, such as fresh pandan leaves and fresh

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coconut milk. The function of pandan in *kuih bakar* is as a natural colourant and also as a natural flavouring. Not only that, but according to the producers, pandan is also very important to mask the eggy taste in *kuih bakar*. So, the function of pandan is very significant in *kuih bakar* making. However, some problems arise from the use of pandan. Firstly, they mentioned that they sometimes have problems with the supply of fresh pandan leaves. Fresh pandan leaves cannot be kept for too long, so they need a supplier to supply them daily. Many problems arise when they have high orders for *kuih bakar*, especially for wedding events and also during festivities such as Ramadan and Hari Raya. They said that sometimes the supplies of pandan leaves are not enough, so they have to find a few other suppliers as a backup. However, sometimes the supplies from these other suppliers are also full and out of stock due to the peak season. One of the experts mentioned that:

> *I have a supplier who supplies fresh pandan leaves to my shop daily. However, the problem comes during peak seasons, when many consumers order kuih bakar for wedding events and also during festivities such as Hari Raya. There are not enough fresh pandan supplies during these kinds of seasons, so I need to find a few other suppliers as a backup. But sometimes, other suppliers are also full and out of stock due to this peak season. (R5)*

Next, all of the producers stated that the amount of colour and flavour produced from the fresh pandan leaves is not intense. So, they still have to add some artificial pandan colouring and flavouring to the *kuih bakar*. They also mentioned that too many pandan leaves would impart a bitter taste to their *kuih bakar*, so they still have to mix the fresh pandan leaf mixture with synthetic colouring and flavouring. According to (Arshimny & Syamsu, 2020)

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natural colouring and flavouring from plants are generally unstable, have low homogeneity, and are also expensive. In contrast, synthetic food colouring and flavouring are more homogenous and stable. This explains the great outcome when synthetic colouring and flavouring are added to *kuih bakar*. The producers stated below:

> *I did put a little bit of synthetic pandan colouring and flavouring into my kuih bakar. The fresh pandan leaf mixture is too pale, and the flavour is a bit dull, so with the help of these synthetic pandan colouring and flavourings, it did enhance the colour and flavour of my kuih bakar. (R2)*
>
> *The problem with fresh pandan leaves is that they don't impart intense colour and flavour. I've tried adding a lot of fresh pandan leaves before, but the outcome was that my kuih bakar tasted too bitter. So, I end up topping up a bit of pandan colouring and flavouring in the kuih bakar for a better result and quality. (R6)*

Next, regarding fresh coconut milk, according to the producers, it cannot be kept for too long. The fresh coconut milk has a very short shelf life, even when stored at a chilled temperature. Coconut milk is a very rich medium; hence, it is more susceptible to the surrounding microorganisms, which leads to the spoilage of coconut milk in a short time (Seow & Gwee, 1997). The producers stated that coconut milk needs to be used right away after purchase, or else it will turn sour and smelly. They also stated that the fresh coconut milk sold in the market is not consistent. Sometimes it is too watery, and the coconut flavour is not intense. They said that there are some coconut milk sellers who are honest in selling coconut milk, but there are also some of them who put too much water in it. Thus, they sometimes received a very dull coconut milk flavour and also inconsistent quality for coconut milk. So, they ended up

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making their own coconut milk, which requires a lot of their time and effort. Some of them even ended up using the instant coconut milk liquid in their *kuih bakar* for its intense coconut milk flavour, longer shelf life, and consistent quality. The producers mentioned below:

> *The problem with fresh coconut milk is that I always received low-quality milk where it was too watery, and I also found that the seller put other substances in it, such as wheat flour. All these had affected the quality of my kuih bakar. So to avoid these unnecessary problems, I've made my own coconut milk by blending and pressing the coconut with a muslin cloth. It requires a lot of effort and time, but I manage to keep the quality of my kuih bakar up to standard. (R3)*

> *Fresh coconut milk has a very short shelf life, so it is difficult for me to make kuih bakar when the order is in high demand. Not only that, some of the fresh coconut milk sellers put too much water in it, and it affects the quality of my kuih bakar. So, I decided to purchase instant coconut milk liquid because it is more concentrated, has a longer shelf life, and it gives me a consistent end product. (R1)*

***Kuih bakar* is costly.** The producers stated that though *kuih bakar* is in demand by consumers, it is costly for them. This is because the consumers expected the selling price of *kuih bakar* to be the same as the other Malay *kuih*. The fact is, the cost of making *kuih bakar* is higher than other Malay *kuih* because *kuih bakar* requires a high amount of 'A' grade eggs, coconut milk, and sugar, which are expensive. They also said that baking *kuih bakar* in an oven requires electricity and is also time-consuming. According to the producers, all these are costly, so they do feel demotivated sometimes to make *kuih bakar* because of the cheap selling price. The producers stated below:

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Honestly, selling kuih bakar is not that profitable compared to selling other kuih, though it is in high demand by the consumers. The consumers expected the selling price of one petal of kuih bakar to be about 50 cents, the same price as the other kuih, such as karipap. But actually, kuih bakar is an expensive kuih. Though I'm selling it for 60 cents per petal, it's still not that profitable, and some consumers are complaining that my selling price is expensive. (R2)

Kuih bakar making is costly to me; the profit margin is low considering I'm using 'A' grade eggs, coconut milk, sugar, flour, and pandan leaves with the high electricity costs nowadays. It's not that profitable, but I cannot increase my selling price, otherwise, my customers will complain that my kuih is expensive. (R4)

Short shelf's life. According to the producers, *kuih bakar* has a short shelf life of around 24 to 48 hours at room temperature. They said that one of the ingredients in *kuih bakar* is coconut milk, which also contributes to a shorter shelf life for *kuih bakar*. Various microorganisms are associated with the coconut due to its rich nutrient content. Thus, food safety measures need to be seriously taken care of by the food sellers to avoid food poisoning among consumers (Aba et al., 2021). The producers stated that they have to make a new batch of *kuih bakar* every day, and if they are unable to finish selling *kuih bakar* for that day, they have to discard it into the waste bin. The producers said that it is a waste of money, time, and effort when they have to discard unsellable *kuih bakar* into the waste bin due to its short shelf life. The producers mentioned below:

My kuih bakar could only last for 48 hours, it has a short shelf life. If you keep kuih bakar longer than 48 hours, it will turn sour and stinky and

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the crust will not be crunchy anymore. Coconut milk is the main reason for making kuih bakar have a short shelf life. (R1)

Kuih bakar can last for 24 to 48 hours, but to be on the safe side, I always advise my customers to consume it within 24 hours. I do not want to be held responsible if the customers have food poisoning because of an expired kuih bakar. So, after 24 hours, I will discard any unsellable kuih bakar into the waste bin. It's a waste of money to throw it in the bin, but I have to accept that kuih bakar has a short shelf life. (R5)

Time-consuming. The producers said that making *kuih bakar* is very time-consuming. This finding is supported by Sharif et al. (2013) who in their study found that the Malay younger generations are uninterested in making traditional foods because the preparation is too time-consuming, tedious, and complicated. Therefore, they prefer to consume convenient modern food products because of their short preparation time and ease of making. According to the producers, *kuih bakar* preparation is time-consuming because they have to prepare the *pandan* leaf essence by cutting and blending the fresh leaves. Then, they need to sieve the leaves for a few times to get a concentrated *pandan*'s essence. They also have to make their own fresh coconut milk by blending and pressing the coconut with a muslin cloth. Next, they have to sieve the flour, wash, and break all the eggs. All these are so time-consuming, and they require hard work. One of the producers mentioned that:

It took me around one to two hours to just prepare the kuih bakar batter. I need to make the pandan leaf essence, and then I also need to prepare the coconut milk, wash all the eggs, break the eggs, sieve the

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flour, and many more steps are needed just to make this kuih bakar. It is very time-consuming and tiring. (R2)

The producers also stated that preparing *kuih bakar* batter is already time-consuming, and then they still have to wait for the baking time, which is around 30 minutes to 1.5 hours. Surprisingly, different sellers have different baking times for *kuih bakar*. So, from the researcher's observation, this is due to the different amount of water content in each of the sellers' formulations. Some of the sellers who use the instant coconut milk liquid have a faster baking time, which is around 30 to 50 minutes, because instant coconut milk is more concentrated and has less water content. They all mentioned that, after preparing the *kuih bakar* batter, they still have to wait for the baking time, which is around 30 minutes to 1.5 hours. Generally, it took them around two to three hours to produce RTE *kuih bakar*. However, for premix *kuih bakar* it is expected that the baking time will be around more or less than 30 minutes due to low water content of the ingredients. The producers mentioned below:

Making kuih bakar is tiring and also time-consuming. Not only that, I have to prepare all of the ingredients from scratch, but I also have to wait for their baking time which is around 1 hour and 30 minutes. Kuih bakar has a long baking time because the batter is more watery compared to the other kuih. (R3)

It took me around two hours to make kuih bakar. It's a long and exhausting process because I have to prepare the pandan leaf essence and many more before baking it in the oven. (R6)

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Table 5.2 : Challenges in Making *Kuih Bakar* according to the Producers

Theme	Description
Raw materials problems	• The producers sometimes have problems with the supply of fresh pandan leaves and fresh coconut milk. Fresh coconut milk cannot be kept for too long and it needs to be used right away after purchase, or else it will turn sour and smelly.
***Kuih bakar* is costly**	• The producers stated that though *kuih bakar* is in demand by consumers, it is costly to them.
Short shelf's life	• According to the producers, *kuih bakar* has a short shelf life of around 24 to 48 hours at room temperature.
Time-consuming	• The producers said that making *kuih bakar* is very time-consuming. Generally, it took the experts around two to three hours just to produce RTE *kuih bakar*.

5.3.3 Producers' Opinions Regarding *Kuih Bakar* Premix

This sub-topic discussed the last research question, which is the producers' opinions regarding *kuih bakar* premix. Based on the previous chapter where the researcher conducted FGD with the consumers, some of them mentioned the usage of premix by the RTE food industries. They had mentioned that the RTE food industries nowadays prefer to use premix as it gives a better end product with great consistency. In this sub-topic, the researcher will validate and triangulate the previous data obtained by digging deep into understanding the producers' opinions regarding this matter. For this particular research question, seven themes emerged from the data obtained from the producers. The summary of the themes was summarised Table 5.3 below.

Interested in buying *kuih bakar* premix. The producers said that they are interested in buying *kuih bakar* premix once it is available in the market. They mentioned that making *kuih bakar* is tedious and time-consuming. If there is a

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product that can help make their work easier, faster, and more convenient, they would definitely love to try it. The producers also mentioned that, as RTE food sellers, they do not mind trying premix products for their business. If it requires less time, they can focus more of their time and resources on making other *kuih.* This finding is in agreement with a study conducted by Contini et al. (2018), which found that people are interested in purchasing convenience processed food because it helps make food preparation easier and helps in the overall improvement, including the quality of the end product. The producers stated below:

> *I'm interested in buying the kuih bakar premix if the taste is delicious and it gives me a consistent end product. Furthermore, it's easy to make, just add water, mix, and bake. (R2)*

> *At home, I did use the western premixes such as chocolate cake premixes, brownies and waffles. It tastes good and is easy to make; however, as a Malay baker, there are not many Malay kuih premixes available in the market, none for kuih bakar premix. So, if kuih bakar premix is available on the market, I would love to try it. (R6)*

Convenient. The producers stated that the main reason they chose *kuih bakar* premix is because it is convenient. This theme of data validated the data obtained from the previous chapter, in which the consumers in FGD too mentioned that *kuih bakar* premix is convenient. Furthermore, one of the themes in the previous sub-chapter above is time-consuming. So, when the researcher asked the producers regarding the idea of developing *kuih bakar* premix where they just need to add water and bake, many of them agreed that this kind of product is very convenient to them in terms of saving a lot of their

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time, energy, and resources. According to the producers, using *kuih bakar* premix could reduce the challenges they had to face every day in making *kuih bakar*.

Barska in 2018 mentioned in his study that convenience food products facilitate food preparation in catering and food business establishments, which saves time, less equipment, and less staff needed for the preparation. The producers stated below:

> *One of the reasons for me to be interested in buying kuih bakar premix once it's available in the market is because it's convenient. Kuih bakar making is time-consuming and also tedious, so if there is an easy option, why not, I'll try. Then, if the taste is the same as the scratch-made one and it also gives me a consistent end product with good quality, of course, I would love to use it. (R3)*

> *For my business, I did use premix too for another RTE food that I sell on my premises. What I like about premix is that it has the right flavour and is also of perfect quality. Premix is very convenient too as a food seller. I think the main reason for me to be interested in buying kuih bakar premix once it's available in the market is because it's convenient. (R6)*

Premix in bulk packaging. The producers stated that they expect the premix to be sold in bulk packaging for their use. This is because bulk packaging will be more convenient and cost-effective for them as sellers. They also mentioned that they prefer the premix to be in plastic packaging instead of putting it in a beautiful box because fancy packaging will incur extra cost, and as a seller, they wanted a cheap wholesale price. Furthermore, the producers

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mentioned that plastic packaging is easier and lighter for the producers to carry and transport to their premises. Plastic packaging and carry bags are widely used around the world because of their benefits, which are low cost, high strength, high barrier properties, and lightweight (Lewis et al., 2010). The producers stated that:

> *I prefer kuih bakar premix to be in bulk form for producers like me so that it is easier for me to buy the premix at once from the wholesaler. I also prefer the packaging to be plastic, just like other flours and premixes that I usually buy from the wholesaler. Plastic packaging is lightweight and easy for me to carry. (R2)*

> *As an RTE kuih bakar producer, I prefer to buy the kuih bakar premix in bulk form. Preferably it should be in just plastic packaging so that it is easy for me to carry, and also this kind of packaging will also make the product less expensive. (R4)*

Oven baking is easy. All of the producers are currently using ovens to bake their *kuih bakar* because ovens are easy and convenient appliances. Baking is one of the most popular and oldest food preparation methods, and the oven is recognised as one of the most used appliances nowadays because of its efficiency and user-friendly applications (Sakin et al., 2009). The producers mentioned that they could easily adjust the preferred time and temperature for their oven. They also said that only by using the oven could they achieve a crunchy crust for *kuih bakar*. The traditional method, where the old generation used coconut coir and charcoal, is irrelevant nowadays. This is because the old baking method is time-consuming, and they cannot produce a lot of *kuih bakar* in a day with this method. Furthermore, this old method is not hygienic, according to them. The oven helps the producers expedite their work in a way

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that makes their work easier because they just need to put the *kuih bakar* batter into the oven and wait for it to bake with the oven timer. The producers mentioned that:

> *I prefer using the oven for kuih bakar, perhaps I'm using the oven for any other foods that require a baking method. This is because the oven is convenient and user-friendly, and I also found that my product baked faster using the oven. It's easy, I do not need to observe the baking process all the time, I just let the kuih bakar bake inside the oven, and the oven timer will ring the bell for me once it's finished. (R6)*

> *I've tried using the old method before with charcoal and coconut coir, but the result is not the same as when I baked in the oven. My kuih bakar tasted better when I baked it in oven compared to the old method of baking. Furthermore, this old method is very time-consuming, and I cannot produce a lot of kuih bakar at one time with that method. (R5)*

Price of less than RM5 for one piece of *kuih bakar.* Most of the producers are selling their *kuih bakar* for RM5 per piece. Hence, they suggest that the price of premix be less than their selling price for one piece of *kuih bakar*, so that they can have extra profit by using this premix. Previously, the consumers in FGD sessions suggested the price of *kuih bakar* be less than RM5 per piece, since the current market price of RTE *kuih bakar* is RM5. Thus, the consumers suggested the price would be less than RM10 per box of packaging, consisting of two pieces of *kuih bakar* from the premixes. These data somehow show that the consumers' price expectations for FGD and those of the producers are the same. Once the *kuih bakar* premix is available in the market, the producers will become consumers too, but in a different segment because they require bulk forms. A study conducted by Roy et al. (2019) found that

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consumers price expectations are important because they will affect the sale of food products, where the majority of them demand a food product that is value for money. Hence, it is important to satisfy the price expectations of consumers for *kuih bakar* premix so that sales losses can be avoided in the future. The producers stated below:

> *The price of the kuih bakar premix needs to be less than my current selling price, which is RM5, so that I can still maintain my selling price even after using the premix. (R2)*
>
> *I'm currently selling my RTE kuih bakar for RM5 per piece. So, I suggest the price of kuih bakar premix be lower than my selling price. The cheaper, the better, so that I can have extra profit by using this premix. (R3)*

One year of shelf's life. The producers said that they expected *kuih bakar* premix to have one year of shelf life. Their expectation is *kuih bakar* premix to have the same shelf life as the other available premixes on the market. Though many of them mentioned that they hardly keep their flours and premixes for more than a month. This is because they usually buy their dried ingredients weekly, even though they have a wholesaler who delivers their ordered ingredients to their premises daily. The producers stated below:

> *I'm not really concerned about the shelf life of the premix because I have a wholesaler who delivers my ordered ingredients to my premises every day. However, I think it is better for kuih bakar premix to have the same shelf life as the other premixes that are already available in the market. (R6)*
>
> *In my opinion, the shelf's life of kuih bakar premix cannot be too long because otherwise there will be weevils and bugs inside it. I usually*

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observe problems with dried ingredients such as flour. If you're asking me about my expectations about the shelf's life, I would say the longest will be one year. However, as a seller, I usually keep my dried ingredient for the longest, which is around one month. (R3)

Same outcome as consumer preferences. The producers mentioned that they wanted the outcome of *the kuih bakar* premix to be the same as consumer preferences. The producers did share some of their knowledge regarding the consumers' preferences based on their daily experiences selling and interacting with the consumers. Surprisingly, the preferences mentioned are similar to the data obtained from the FGD sessions conducted with the consumers previously. Thus, the data obtained has been triangulated and also validated in the interview. The producers mentioned that consumers prefer *kuih bakar* in pandan flavour the most. They also prefer a medium-size *kuih bakar*, a light green colour, and a crunchy crust. According to Botonaki and Mattas (2010), understanding consumer preferences by the sellers is important because it will directly affect the food business's sales. The producers stated below:

I expected the outcome of the kuih bakar premix to be the same as the consumer preferences, such as wanting a crunchy crust and also a light green colour for kuih bakar. Speaking about the light green colour from pandan, previously, I did sell different kinds of flavours for kuih bakar such as corn, banana, pandan, and pumpkin. However, I've stopped making all these flavours except for the pandan flavour. My customers prefer the pandan flavour more for kuih bakar than the other flavours. Even they do not prefer kuih bakar with spices like the one sold in Melaka. (R5)

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After selling kuih bakar for many years now, I've come to understand that consumers prefer a medium-sized kuih bakar, so that is why I use mould size no. 2 for kuih bakar. The consumers also prefer a crunchy crust with a little bit of burnt on it and a light green colour. So, I expected the kuih bakar premix to have the same outcome as I mentioned just now. (R3)

Table 5.3 : Producers' Opinions Regarding *Kuih Bakar* Premix

Theme	Description
Interested in buying *kuih bakar* premix	• The producers said that they are interested in buying *kuih bakar* premix once it is available in the market.
Convenient	• The producers stated that the main reason for them to choose *kuih bakar* premix is because it is convenient.
Premix in bulk packaging	• The producers stated that they expect the premix to be sold in bulk packaging because bulk packaging will be more convenient and cost-effective for them as sellers.
Oven baking is easy	• All of the producers are currently using ovens for baking their *kuih bakar* because ovens are easy and convenient appliances.
Price of less than RM5 for one piece of *kuih bakar*	• Most of the producers are selling their *kuih bakar* for RM5 per piece. Hence, they suggest that the price of premix be less than their selling price.
One year of shelf's life	• The producers expected the *kuih bakar* premix to have the same shelf life as the other available premixes in the market.
Same outcome as consumer preferences	• The producers mentioned that they wanted the outcome of *the kuih bakar* premix to be the same as consumer preferences.

5.4 Chapter Summary

Kuih bakar producers with more than five years' experience selling *kuih bakar* were recognised as experts in this study. In-depth interviews with six *kuih*

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bakar producers (n = 6) were conducted to understand the challenges of making *kuih bakar* from scratch. This is important so that the researcher can develop a product that can help reduce the challenges of making *kuih bakar*. Next, the producers' opinions regarding *kuih bakar* premix were also explored so that the process of developing premix in the following chapter, which is Chapter 6, could be improved. Firstly, from the findings of the first research question, which is the producers' reasons for selling *kuih bakar*, they answered that they had started the business because they had a high interest in baking Malay *kuih.* They also mentioned that *kuih bakar* is liked by all generations and is also in high demand by consumers.

Next, from the findings of the second research question, the researcher discovered the challenges in making *kuih bakar*. Some of the challenges that the producers had to face were that *kuih bakar* making is time-consuming, *kuih bakar* is costly, *kuih bakar* has a short shelf life, and they also had difficulty getting *pandan* leaf and coconut milk supplies. Lastly, for the last research question, the producers' opinions were explored regarding the *kuih bakar* premix. The producers mentioned that the premix is convenient; they prefer the premix to be in bulk packaging, oven-baked, and have the same outcome as consumer preferences. In conclusion, the data obtained in this chapter helped to understand the producer's point of view and also their challenges in making *kuih bakar*, including their opinions of *kuih bakar* premix. All of the data obtained in FGD sessions with the consumers, including an in-depth interview with the producers, provided the researcher with a clear understanding of the requirements and the important criteria that had to be overcome so that the

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best *kuih bakar* premix could be developed in the next chapter, which is Chapter 6.

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CHAPTER 6

DEVELOPMENT AND OPTIMISATION OF *KUIH BAKAR* PREMIX FORMULATION USING RESPONSE SURFACE METHODOLOGY

6.1 Introduction

Malaysian heritage food, *kuih bakar,* is significant to the nation's long history, both culturally and gastronomically. This delicious *kuih* is renowned for its distinct flavours, cooking procedure, and connection to numerous cultural celebrations. "Bakar" means "baked," signifying the cooking method used to make this specific treat. The term "kuih" often refers to classic Malaysian cakes or pastries. A batter comprising flour, coconut milk, eggs, sugar, and pandan leaves for aroma is typically used to make *kuih bakar* (Sharifah et al., 2015). A solid but moist cake with a little crispy top is produced when the batter is placed into a mould and baked. A rich and fragrant flavour is added to the *kuih* by using coconut milk. In addition to having a delicious flavour and texture, *kuih bakar* frequently has symbolic and cultural connotations. It is a must-have for occasions like *Hari Raya* and other important cultural festivals since it is frequently connected to joyous occasions, get-togethers with family, and festivities (Raji et al., 2017).

The formulation of *kuih bakar* premix was developed based on the data obtained from consumer focus group discussions (FGD) and in-depth interview sessions with the *kuih bakar* producers. The researcher had applied response surface methodology (RSM) for the optimisation of the *kuih bakar* premix formulation, which is part of the design of experiment (DOE) in this chapter. The researcher has conducted the DOE with the ingredients for the

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premix as the independent variables (factors) and consumer sensory preference and acceptability tests as the dependent variables (responses).

At present, no studies on the optimisation of the formulation of *kuih bakar* premix have been conducted. Although the amounts of conventional ingredients have been recommended in various homemade recipe books and on the internet, no scientific study of the optimization of the basic formulation of *kuih bakar* premix has been reported. The best formulation for making this *kuih bakar* premix is needed as a reference for food practitioners and commercialization.

6.1.1 Objective

To develop the optimised formulation using response surface methodology for *kuih bakar* premix.

6.1.2 Research Question

What is the optimised formulation for *kuih bakar* premix?

6.2 Materials and Methods

The conventional ingredients for making the freshly baked *kuih bakar* were used in the laboratory before producing the final premix. The conventional ingredients, such as fresh whole eggs, liquid coconut milk, fresh pandan leaves, and liquid green colourant, were purchased from a supermarket in Serdang, Selangor. Preliminary experiments were conducted in the lab using

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these conventional ingredients in order to develop a successful premix formulation. Some of the conventional formulations were based on ideas shared by the *kuih bakar* producers in the previous interview session. After several trials, the researcher developed the premix using all dried ingredients in the formulation. The conventional formulation needs to be tested first before the premix is developed. This is because the conventional formulation was tested prior to developing the premix. This conventional formulation was the basis and guidance for the researcher to develop the premix formulation.

All the ingredients for *kuih bakar* are already available on the market in dried form. Thus, the researcher decided to purchase all the available dried ingredients from the market before weighing and mixing them in the right proportion to produce *kuih bakar* premix. The researcher had successfully turned it into an all-in-one premix product where consumers just needed to add water, stir, and bake. The detailed explanation of how to make this premix is discussed in sub-topic 6.2.1 below.

6.2.1 Premix Formulation and Preparation

All the ingredients in the *kuih bakar* premix were based on the baker's percentage calculation because it represents a more accurate calculation for bakery products. Flour is one of the major ingredients in bakery products, and the baker's percentage calculation is based on the overall value of the flour (Arepally et al., 2020). The calculation of the baker's percentage for each of the ingredients in the *kuih bakar* premix is shown as follows.

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Baker's percentage calculation:

Ingredient percentage = (Weight of ingredient ÷ weight of flour) × 100 .. Eq. 1

Flour, whole egg powder, coconut milk powder, pandan leaf powder, and green colourant powder were sieved together. Then, the salt and sugar were added to the sieved powder and mixed uniformly. This mixture was placed in a polyethylene plastic bag. Then, the sesame seeds were put into another separate polyethylene plastic bag for the *kuih bakar* topping (Figure 6.1). Lastly, all these polyethylene plastic bags were packed into a box as a whole premix product, as suggested by the consumers in FGD.

The step-by-step procedure on how to bake the *kuih bakar* premix is shown below. All the steps will only take 45 to 60 minutes of the consumer's time to mix the premix with water and bake Figure 6.1 to Figure 6.6 show the photos of *kuih bakar* prepared from the premix.

1. Grease the mould, and then preheat the greased mould in the oven. Preheat the oven at 200^0C for 10 minutes.
2. Pour the premix ingredients into a bowl. Measure the water and whisk it together with the premix until it is homogenous.
3. Pour the mixture into the preheated *kuih bakar* mould and sprinkle the provided sesame seeds on top of the mixture.
4. Lastly, bake in the oven for 30 to 40 minutes.

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Figure 6.1 : The All-in-One *Kuih Bakar* Premix as Suggested by the Consumers

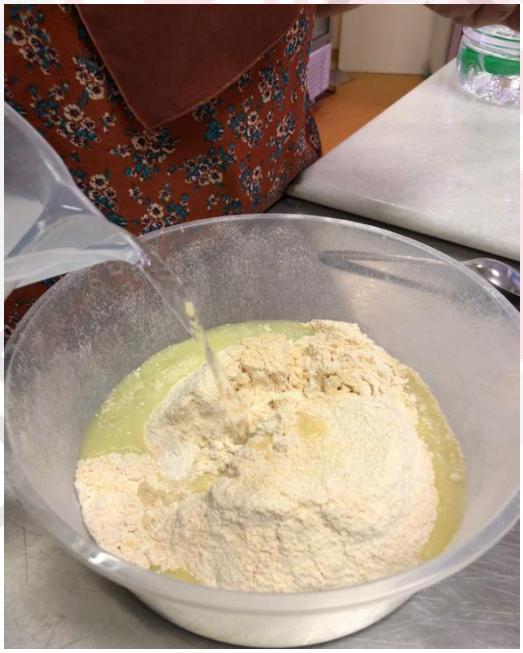

Figure 6.2 : Pouring Water into the *Kuih Bakar* Premix

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Figure 6.3 : Whisking of *Kuih Bakar* Mixture until Homogenous

Figure 6.4 : *Kuih Bakar* Mixture in a Preheated Mould Sprinkled with Sesame Seeds

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Figure 6.5 : Baked *Kuih Bakar* Made from the Current Premix

Figure 6.6 : A Piece of Baked *Kuih Bakar* Produced Using the Premix

6.2.2 Sensory Evaluation

The sensory evaluation sessions were conducted with 52 panellists (n = 52). The necessity of gathering trustworthy and statistically significant data on consumer preferences is the basis for the selection of 52 panellists for the sensory evaluation. The number of panellists typically range from 30 to 100, with some sources recommending a minimum of 30 for descriptive analysis and 50–100 for consumer acceptance tests (Stone et al., 2012). Selecting 52

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panellists for this study is within the advised range, guaranteeing that the sample size is adequate to record a wide range of customer responses and lessen the influence of outliers. Each panellist was invited to two sensory sessions and presented with 7 formulations in each session to prevent fatigue. Based on the experimental designs, there were a total of 14 formulations that needed to be tested by each panellist. The FGD participants in the previous chapter were also invited to attend this sensory session. Advertisements regarding the sensory sessions were distributed via electronic and hardcopy posters. The electronic poster was distributed via Facebook, WhatsApp, Instagram, and Telegram.

The sensory sessions were conducted at the Sensory Laboratory, UPM. Each of the sensory panellists was served with a piece of baked *kuih bakar* premix presented randomly in plastic containers with three-digit random numbers, and the order of presentation was randomised. The panellists were informed prior to the session that they needed to rinse their mouths with the plain water provided before tasting each of the samples. This is to avoid any carry-over effects and to differentiate each of the samples (de Kock & Magano, 2020). Each of the panellists needs evaluate each of the samples using the given hedonic score form of a 9-point Likert scale, where score 1 = dislike extremely to score 9 = like extremely.

6.2.3 Experimental Design and Analysis

The samples of *kuih bakar* premix were prepared according to response surface methodology (RSM) with a central composite design (CCD) consisting

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of 2 factors central composite, 3 coded levels, with 2 blocks, resulting in 14 experimental runs. The chosen independent variables (factors) were sugar and coconut milk powder because these are the main ingredients affecting the quality of *kuih bakar* due to its higher amount compared to other ingredients in the premix. These were based from the preliminary experiments conducted in the laboratory. The amount of other ingredients used, which include water, egg powder, pandan leaf powder, green colourant powder, salt, and sesame seeds, was fixed according to the best final formulation obtained in the preliminary trials. The dependent variables (responses) were sensory attributes of baked *kuih bakar,* which include flavour, colour, sweetness, chewiness, crunchiness, creaminess, and overall acceptability. The dependent variables were chosen based on the FGD data obtained in the previous chapter.

The effect of the two independent variables on the responses (Y) was modelled using the second-order polynomial response surface. The equation derived using RSM for the prediction of the response variables are as follows:

$$Y = \beta_0 + \beta_1\chi_1 + \beta_2\chi_2 + \beta_{11}\chi_1^2 + \beta_{22}\chi_2^2 + \beta_{12}\chi_1\chi_2 \quad \text{.....Eq. 2}$$

Where, Y is the response variable, β_0 is an offset term, β_1 and β_2 are the regression coefficients for linear effect terms, β_{11} and β_{22} are quadratic effects, and β_{12} is an interaction effect. In this model, χ_1 and χ_2 are the independent variables (sugar and coconut). The significance of the equation parameters for each response variable was also assessed by F-value at a probability of 0.05. Model adequacy was determined using model analysis, the lack-of-fit

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test, and coefficients of determination. The experimental design matrix, data analysis, optimization, and verification procedures were performed using the Minitab V. 17 statistical package (Minitab Inc., State College, Pennsylvania).

6.3 Results and Discussions

The effects of sugar and coconut milk on the kuih bakar's hardness, chewiness, crunchiness, sweetness, colour, flavour, and overall acceptability are displayed in the Table 6.2,Table 6.3 and Table 6.4 below. The second-order model equation was fitted to the independent and dependent variables, and the goodness of fit was evaluated.

6.3.1 Determination of Optimum Formulation for *Kuih Bakar* Premix

The range of percentages based on the baker's percentage of the two basic ingredients of *kuih bakar* premix were sugar, ranging from 23% to 137%, and coconut milk powder, ranging from 1% to 47%. Table 6.1 shows the values of the coded and actual variables for sugar, which are -1.414 (23%), -1 (40%), 0 (80%), 1 (120%), and 1.414 (137%), and for coconut milk powder, -1.414 (1%), -1 (8%), 0 (24%), 1 (40%), and -1.414 (47%). These coded and actual values were incorporated into the design and analysed in 14 combinations with 2 blocks. The central point of the design was repeated 8 times to calculate the reproducibility of the method.

Table 6.2 shows the means and standard deviations for sensory attributes of the *kuih bakar* premix formulation. Sensory parameters can determine the consumer acceptability of the *kuih bakar* premix. It was reported that sensory

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attributes such as colour, flavour, sweetness, creaminess, chewiness, crunchiness, and overall acceptability were used as important quality properties in developing new food products (Delicato et al., 2020). These sensory attributes were evaluated by the panellists, and the mean scores were summarised in Table 6.2. The scores for overall acceptability were consistently high (≥8.00) for central coded values for sugar and coconut milk powder, which are 80% and 24%, respectively. According to Meilgaard et al. (2007), a sensory hedonic test is a good option when a product researcher wishes to ascertain the "affective status" of a product, or how well people like it. Based on Table 6.2 higher and lower values from the central coded values had lower scores for overall acceptability. The combination of 80% sugar and 24% coconut milk imparts a palatable *kuih bakar*. The effects of sugar and coconut milk powder will be further discussed in sub-topic 6.3.2.

Table 6.1 : Coded and Actual Variables for the Response Surface Design for *Kuih Bakar* Premix

	Coded		Actual	
Run number	**Sugar**	**Coconut**	**Sugar (%)**	**Coconut (%)**
1	1	-1	120	8
2	0	0	80	24
3	0	0	80	24
4	1	1	120	40
5	-1	-1	40	8
6	0	0	80	24
7	-1	1	40	40
8	0	0	80	24
9	0	-1.414	80	1
10	1.414	0	137	24
11	-1.414	0	23	24
12	0	1.414	80	47
13	0	0	80	24
14	0	0	80	24

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Table 6.2 : Means and Standard Deviations for Sensory Attributes of the *Kuih Bakar* Premix Formulation

Formulation		Sensory Attributes (Mean Score)						
Sugar (%)	Coconut (%)	Flavour	Colour	Crunchiness	Chewiness	Creaminess	Sweetness	Overall Acceptability
120	8	4.53± 0.93	8.57±0.43	4.21±0.67	4.42±0.42	4.20±1.68	4.45±1.02	4.51±0.63
80	24	8.83±0.65	7.81±0.24	7.60±0.50	7.50±0.32	8.89±0.51	8.57±0.73	8.70±0.33
80	24	8.79±0.76	7.55±0.25	7.45±0.67	7.38±0.50	8.81±0.70	8.67±0.58	8.81±0.51
120	40	8.51±1.72	8.51±0.37	7.50±1.81	7.56±0.53	8.13±0.67	8.05±0.59	8.50±0.57
40	8	3.75±0.85	6.12±1.49	3.50±2.31	3.79±0.42	3.85±0.65	3.65±0.86	3.71±0.63
80	24	8.72±0.85	7.75±0.66	7.38±0.41	7.06±0.41	8.79±0.80	8.71±0.64	8.75±0.77
40	40	4.23±1.87	6.00±2.15	4.71±0.80	4.15±0.80	4.51±0.82	4.50±0.89	4.56±0.87
80	24	8.85±0.84	7.83±0.64	7.85±0.42	7.98±0.31	8.75±0.48	8.61±0.60	8.83±0.58
80	1	2.79±0.13	7.10±0.82	2.46±0.72	2.69±1.80	2.83±0.61	2.98±0.99	2.51±0.74
137	24	6.31±0.77	8.75±0.57	5.98±0.50	5.23±2.56	6.23±2.00	6.21±2.09	6.27±1.87
23	24	2.63±2.13	2.73±0.93	3.92±0.70	3.12±0.80	2.21±0.85	2.27±0.25	2.52±0.51
80	47	6.08±0.61	7.21±0.65	5.63±1.62	5.96±0.59	6.35±0.63	6.43±0.75	6.10±0.65
80	24	8.75±0.64	7.91±0.56	7.92±0.58	7.37±0.41	8.77±0.65	8.61±0.70	8.85±0.73
80	24	8.77±0.75	7.73±0.50	7.54±0.45	7.58±0.60	8.78±0.85	8.63±0.87	8.75±0.60

Note: ±Standard deviation; score 1=dislike extremely; score 5=neither like nor dislike and score 9=like extremely

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6.3.2 Effect of Sugar and Coconut Milk on *Kuih Bakar* Premix

In order to assess the significance of the linear, quadratic, and interaction effects of the independent variables on the dependent variables, the analysis of variance (ANOVA) was used to identify any misfits and determine the significance of the effects (Table 6.3). The lack of fit test evaluates how well a model represents data in the experimental domain at points when they were excluded from the regression (Athanasiadis et al., 2023). Based on Table 6.3 all variables for the main, quadratic, and interaction effects were significant at $p \leq 0.05$, except for colour, which was not significant for the linear effect of the coconut, the quadratic effect of the coconut, and the interaction effect of sugar and coconut. There was no interaction effect between sugar and coconut for colour variable due to the green colourant used in the formulation was already adequate to impart a nice green colour. This is proven by the high overall acceptability of the sensory scores by the panellists. According to Gan et al. (2007), coconut milk did not impart notable colour when cooked due to its white colour in nature.

Table 6.4 below shows the coefficients of second-order polynomials and how varied amounts of sugar and coconut milk powder affect the sensory characteristics of baked *kuih bakar* premix. All the responses had R values that were greater than 80%, indicating a significant amount of variability that could be explained by the data. It was recommended that for a well-fitting model, the coefficient of determination, or R^2, should be at least 80%. R^2 is the percentage of variance in the response that is related to the model as opposed to random error (Ge et al., 2023). To aid visualisation, the response

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surfaces for these response variables are shown in Figure 6.7- Figure 6.12. The response surface models developed were satisfactory. All the response variables except colour had an optimum curve for the response surface models generated. As previously discussed, colour does not have any interaction between sugar and coconut. Therefore, the researcher eliminated the insignificant data for colour. The elimination of insignificant data in RSM is necessary in order to obtain an accurate model (Bashir Mir et al., 2021). This explains the reason why there is no surface model for colour.

Table 6.4 and Figure 6.7 to Figure 6.12 showed that any additional amount of sugar and coconut will negatively affect the sensory variables of flavour, sweetness, creaminess, crunchiness, chewiness, and overall acceptability of *kuih bakar* due to the parabolic pattern of the response surface graphs. This is because too much sugar will make the *kuih bakar* taste too sweet. Sugar is a type of sweetener that, if consumed in excess will cause undesirable effects on food products, such as too sweet (Carcelli et al., 2022). Too much sugar also generates a Maillard reaction, which will cause an unpleasant burnt taste that is unpalatable to consumers (Shen et al., 2018). While excess amount of coconut milk powder will cause undesirable texture and taste of the *kuih bakar*. Coconut milk has an aftertaste that is undesirable when consumed in excess due to its properties that contain fats and its nutty taste, which in large amounts will impart a bitter taste (Yaakob et al., 2012). A large amount of coconut milk will also soften the *kuih bakar* texture due to the fat content in coconut milk; hence, it will make the *kuih* less chewy (Abu-Jdayil et al., 2004; Gan et al., 2007). Therefore, these explain the interaction of sugar and coconut milk in

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excess will cause undesirable sensory properties to the consumers. However, the optimum amount of sugar and coconut milk powder will create a desirable taste and texture with their optimum curve effects, as shown in Figure 6.7to Figure 6.12.

The positive linearity of flavour, sweetness, creaminess, crunchiness, chewiness, and overall acceptability show that sugar and coconut positively affect the sensory variables. This is because sugar acts as a sweetener, and when induced with heat, it causes a nice aroma and flavour (Sahin et al., 2019). Not only that, but sugar also affected the texture by softening it, allowing a fine texture, and making the surface of the *kuih* crunchier (Renzetti & van der Sman, 2022). The presence of coconut milk powder improved the flavour, produced a more consistent texture, and increased the firmness of the *kuih* (Gan et al., 2007; Simuang et al., 2004). This is because fat makes up most of its composition, which helps in retaining the moisture content of the kuih (Tansakul & Chaisawang, 2006).

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Table 6.3 : Analysis of Variance (p-value and F-value) for the Independent Variables in the Final Reduced Models

Variables	Probability values	Main effect		Quadratic effect		Interaction effect
		B_1	B_2	B_{11}	B_{22}	B_{12}
Colour	**p-value**	0.000*	-	0.002*	-	-
	F-value	78.42	-	16.08	-	-
Flavour	**p-value**	0.000*	0.000*	0.000*	0.000*	0.003*
	F-value	80.60	63.53	173.06	176.17	18.74
Crunchiness	**p-value**	0.000*	0.000*	0.000*	0.000*	0.009*
	F-value	55.22	108.34	117.29	220.82	11.62
Chewiness	**p-value**	0.001*	0.000*	0.000*	0.000*	0.020*
	F-value	27.08	36.23	69.98	63.02	8.48
Creaminess	**p-value**	0.000*	0.000*	0.000*	0.000*	0.006*
	F-value	59.12	58.06	164.81	137.02	13.56
Sweetness	**p-value**	0.000*	0.000*	0.000*	0.000*	0.007*
	F-value	83.84	74.12	206.14	161.51	12.88
Overall Acceptability	**p-value**	0.000*	0.000*	0.000*	0.000*	0.013*
	F-value	51.86	50.57	115.60	120.99	10.14

Subcscripts: 1 = Sugar; 2 = Coconut (*Significant at $p \leq 0.05$)

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Table 6.4 : Estimated Regression Coefficients, Correlation Coefficient (R^2), and Probability Values for Responses in the Final Reduced Models

Coefficients	Response Variables						
	Colour	Flavour	Crunchiness	Chewiness	Creaminess	Sweetness	Overall Acceptability
Constant							
β_0	1.173	-5.135	-2.723	-2.73	-5.65	-5.662	-5.53
Linear							
β_1	0.1213	0.1950	0.1221	0.1428	0.2092	0.2076	0.1970
β_2	-	0.3320	0.3180	0.2380	0.3311	0.3229	0.3536
Square							
β_{11}	0.000495	-0.001223	-0.000760	- 0.000918	- 0.001311	- 0.001265	- 0.001219
β_{22}	-	-0.007712	-0.006518	- 0.005446	- 0.007470	- 0.006999	- 0.007796
Interaction							
β_{12}	-	0.001367	0.000812	0.001086	0.001277	0.001074	0.001227
R^2	89.57%	98.38%	98.39%	96.06%	98.09%	98.46%	97.65%
R^2 (adjusted)	87.68%	97.37%	97.39%	93.61%	96.90%	97.50%	96.18%
Lack of fit (p-value)	0.001*	0.000*	0.101	0.059	0.000*	0.000*	0.000*

Subscripts: 1 = Sugar; 2 = Coconut (*Significant at $p \leq 0.05$)

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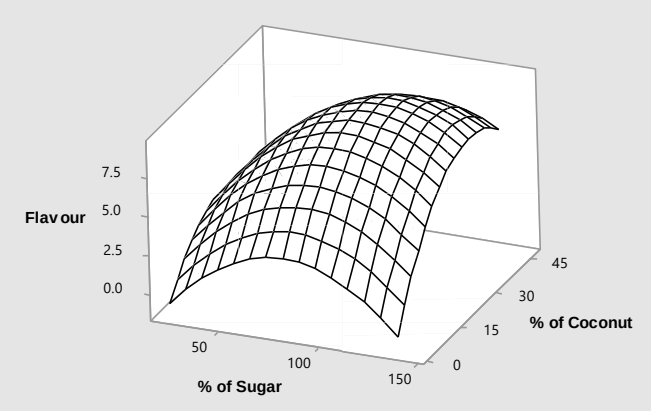

Figure 6.7 : Response Surface Plot of the Effects of Sugar and Coconut on Flavour of the *Kuih Bakar* Premix

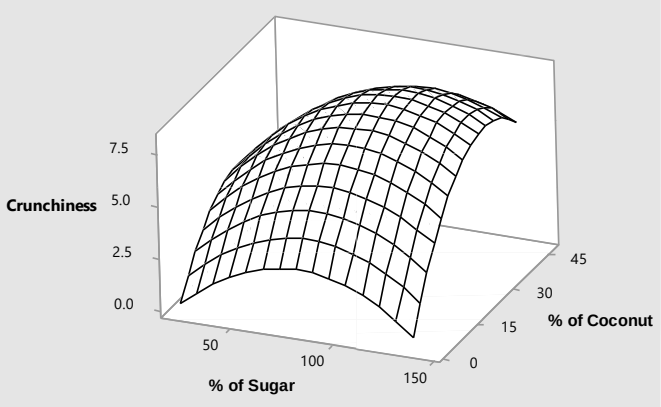

Figure 6.8 : Response Surface Plot of the Effects of Sugar and Coconut on Crunchiness of the *Kuih Bakar* Premix

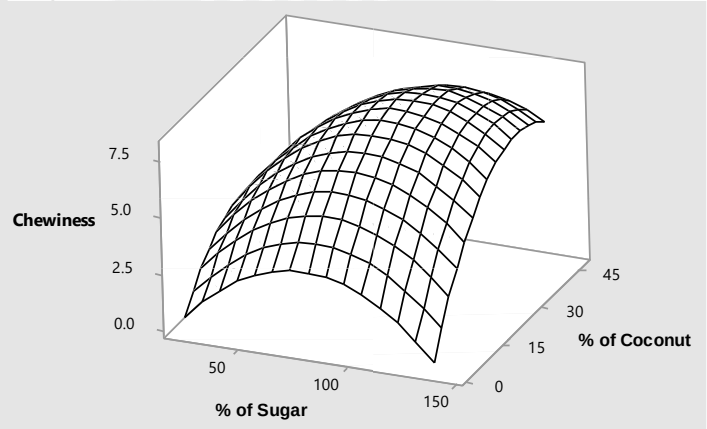

Figure 6.9 : Response Surface Plot of the Effects of Sugar and Coconut on Chewiness of the *Kuih Bakar* Premix

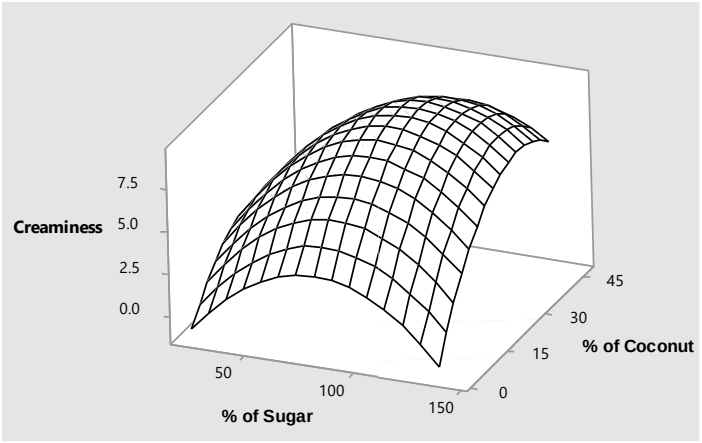

Figure 6.10 : Response Surface Plot of the Effects of Sugar and Coconut on Creaminess of the *Kuih Bakar* Premix

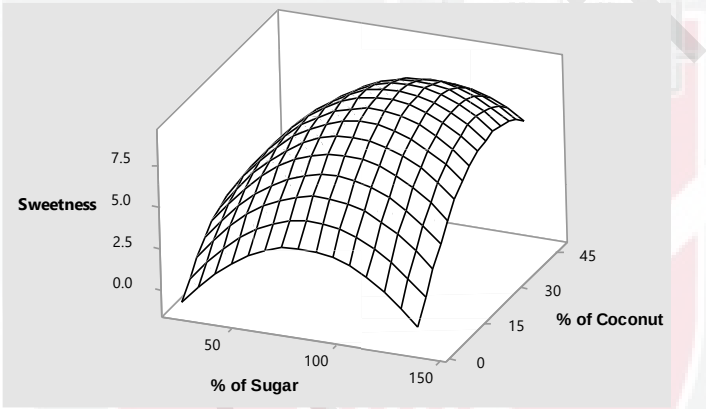

Figure 6.11 : Response Surface Plot of the Effects of Sugar and Coconut on Sweetness of the *Kuih Bakar* Premix

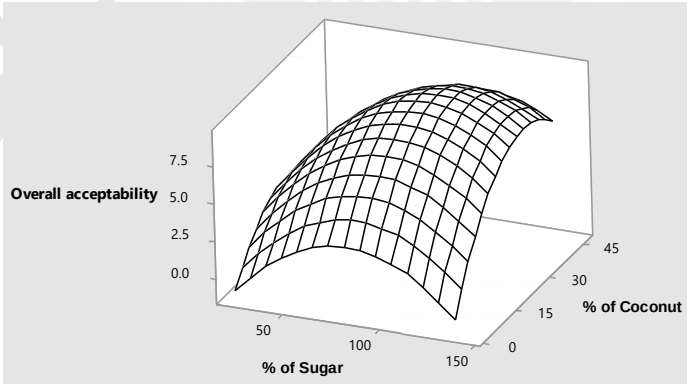

Figure 6.12 : Response Surface Plot of the Effects of Sugar and Coconut on Overall Acceptability of the *Kuih Bakar* Premix

6.3.3 Optimisation of *Kuih Bakar* Premix

The desirability functions of RSM were used to determine the optimum amount of sugar and coconut milk powder. Based on these results, sensory attributes such as sweetness, chewiness, creaminess, crunchiness, colour, flavour, and overall acceptability were selected as the control parameters. The optimum formulation was generated based on the best possible scores for sensory variables (Ashenafi et al., 2023). Based on Figure 6.13 the optimum formulation for *kuih bakar* premix is 102.28% for sugar and 36.11% for coconut milk powder, and the predicted values for each of the sensory response variables are as follows: overall acceptability score is 9.00, sweetness is 8.84, chewiness is 7.77, creaminess is 8.97, crunchiness is 7.80, colour is 8.40, and flavour is 8.99. The optimum formulation developed is acceptable since any further increase in sugar and coconut milk powder amounts will cause undesirable effects on the response variables.

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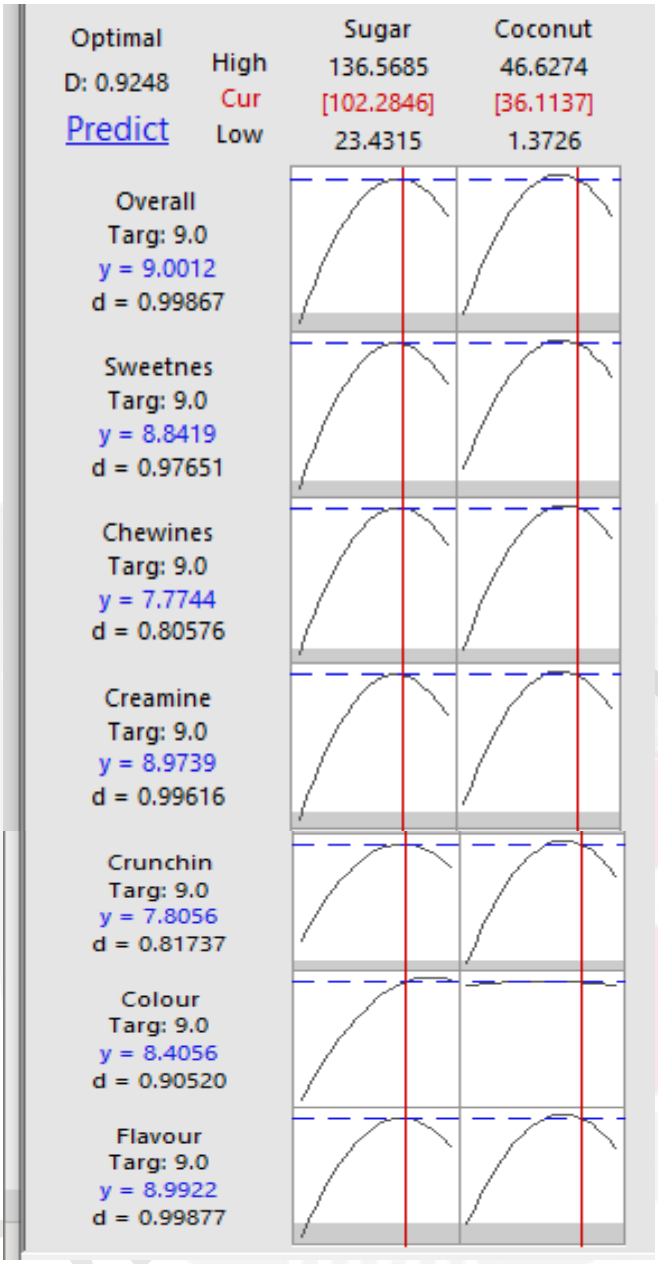

Figure 6.13 : Predicted Optimal Point and Responses Values in Response Optimization Graph

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6.3.4 Validation of the Final Reduced Model

The validation of the final reduced model is the final step in RSM (Kissiedu et al., 2020). This step is necessary in order to determine the validity of the model and the optimum formulation generated (Devi et al., 2023). The results of comparing the experimental values of each response to those predicted by the model's equations are shown in Table 6.5. The predicted and experimental values were within the acceptable range and were not significantly different at $p \geq 0.05$. As a result, the model is valid to optimise the *kuih bakar* premix's formulation.

Table 6.5 : Predicted and Experimental Value of the Response Variables at Optimum Formulation of *Kuih Bakar* Premix

Response Variables	Experimental Values	Predicted Values
Colour	8.75 ± 0.21^{a}	8.45^{a}
Flavour	8.85 ± 0.55^{a}	8.99^{a}
Crunchiness	7.92 ± 0.32^{a}	7.81^{a}
Chewiness	7.98 ± 0.27^{a}	7.77^{a}
Creaminess	8.89 ± 0.19^{a}	8.97^{a}
Sweetness	8.71 ± 0.15^{a}	8.84^{a}
Overall Acceptability	8.85 ± 0.67^{a}	9.00^{a}

[a] Means having the same superscripts within the row did not differ significantly ($p \geq 0.05$)

6.4 Chapter Summary

Response surface methodology is an important method to optimise the basic formulation of *kuih bakar* premix. The sensory evaluation sessions were conducted with 52 panellists (n = 52). The amount of sugar and coconut milk powder that were used in this formulation had a significant impact on sensory attributes such as flavour, colour, sweetness, creaminess, crunchiness, chewiness, and overall acceptability. The quality of the *kuih bakar* premix can

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be predicted using the model equation created in this study. Based on the optimisation graphs, the ideal concentrations of sugar and coconut milk powder to produce *kuih bakar* premix with the desired properties would be 102.28% and 36.11%, respectively. In conclusion, the final optimum formulation for *kuih bakar* premix based on the baker's percentage is as follows: flour = 100%, sugar = 102.28%, coconut milk powder = 36.11%, egg powder = 15.00%, pandan powder = 1.60%, green colourant powder = 0.02%, salt = 0.80%, sesame seeds = 0.40%, and water = 300%. This optimum formulation produces *kuih bakar* with favourable colour, flavour, crunchiness, chewiness, creaminess, and overall acceptability, with mean scores ranging from 7.92 to 8.89, indicating all the sensory attributes of *kuih bakar* prepared from the premix are liked by the panellists.

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CHAPTER 7

SUMMARY, CONTRIBUTIONS, IMPLICATIONS, LIMITATIONS, RECOMMENDATIONS FOR FUTURE RESEARCH AND CONCLUSION

7.1 Summary

This research study concludes that consumer-led food product development shows tremendous promise in bridging the gap between tradition and innovation for the premix formulation of *kuih bakar*, a Malaysian heritage food. The study provides a multifaceted approach to maintaining and modernising cultural culinary heritage through exploration of consumer preferences and difficulties experienced by the producers, along with the use of Response Surface Methodology (RSM) to optimise the premix formulation.

When a large number of samples are required for the data collection, FGD is an effective method for qualitative research. Therefore, using FGD, the researcher was able to discuss with 62 consumers (n = 62). This is crucial to better understanding consumers. The researcher documented and disseminated the findings in this chapter, together with the responses to each research question. Consumers preferred pandan flavour, light green colour, soft and chewy texture, as well as a creamy and intermediate level of sweetness for *kuih bakar*, according to the findings. Additionally, consumers want a *kuih bakar* premix packaged in a suitable box with baking times between 30 to 50 minutes.

The consumers perception of *kuih bakar* premix based on the FGD indicated that such a product is on trend, can be utilised by RTE food vendors, including

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food makers, has a strong potential for worldwide marketing, is practical, and aids in the preservation of traditional foods. The researcher also examined and comprehended consumer preferences, expectations, and opinions of *kuih bakar* premix in this FGD study. This is crucial so that the researcher can create a quality product based on the demands put forth by the customers.

Next, the researcher conducted interviews with the *kuih bakar* producers with more than five years of experience, who were acknowledged as experts. In order to better understand the difficulties of creating *kuih bakar* from scratch, the researcher conducted in-depth interviews with six sellers (n = 6). This is crucial so the researcher can create a product that can assist in lowering the difficulties in producing *kuih bakar*. The researcher would also like to know their perspectives on *kuih bakar* premix. The researcher asked why the producers started their business selling *kuih bakar*, they revealed that they were passionate about baking Malay *kuih*. Additionally, they stated that *kuih bakar* is popular throughout all age groups and is always in demand from their customers.

As a result of the answers to the research question, the researcher then understands the difficulties in producing *kuih bakar*. The producers had to cope with issues with pandan and coconut milk in addition to the fact that preparing *kuih bakar* takes a lot of time, costs a lot, and has a short shelf life. Finally, in order to answer the final research question, the researcher looked into the producers' perspectives on *kuih bakar* premix. Premixes are convenient, according to the producers, who also prefer to purchase the

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premix in bulk packaging, oven baking, and results that are similar to those desired by consumers. In conclusion, the information gathered in this chapter assisted the researcher in comprehending the producer's perspective, as well as their difficulties in producing *kuih bakar* and their views on *kuih bakar* premix. The researcher was able to better understand the requirements and crucial criteria that needed to be addressed in order to create the best *kuih bakar* premix. This was made possible by the data gathered during FGD sessions with the consumers, including an in-depth interview with the producers.

The basic *kuih bakar* premix formulation can be improved using the response surface methodology. There were 52 panellists involved in the sensory evaluation sessions (n = 52). The *kuih bakar* premix main ingredients, which are sugar and coconut milk powder, have a major impact on sensory qualities such as flavour, colour, sweetness, creaminess, crunchiness, chewiness, and overall acceptability of the final baked product. The model equation developed in this study can be used to forecast the quality of *kuih bakar* premix. The optimum concentrations of sugar and coconut milk powder for the production of *kuih bakar* premix with the desireable sensory attributes are 102.28% and 36.11%, respectively based on the baker’s percentage.

As a harmonious mix of tradition and innovation, this research study highlights the value of consumer-led food product development for the premix formulation of *kuih bakar*, a traditional Malaysian food. The study presents a comprehensive strategy for protecting cultural heritage while satisfying

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contemporary consumer needs by comprehending consumer preferences, addressing issues faced by traditional food producers, and using Response Surface Methodology (RSM) to optimise the premix composition. The study's findings are relevant in a variety of cultural, culinary, economic, and intellectual contexts and present convincing findings for the revival of traditional foods and their ongoing relevance in a changing gastronomic environment.

7.2 Research Contributions

In this study, a consumer-driven premix formulation for the Malaysian heritage food *kuih bakar* is developed, making a substantial contribution to the fields of food science and consumer research. In contrast to earlier research that only looked at the physicochemical characteristics of conventional food items, this study combines producer difficulties, consumer insights, and sensory evaluation to produce a premix formulation that is ready for the market. Response surface methodology (RSM), expert interviews, consumer focus groups, and the Stage-Gate Model (Cooper, 2017) as a framework for product development guarantee a thorough approach that unites qualitative and quantitative approaches in food innovation.

This study's consumer-led approach to heritage food product development is one of its main innovations. Few heritage food studies concentrate on bringing traditional foods closer to the current consumer, whereas many highlight historical documentation and preservation efforts (Kamaruzaman et al., 2023). This study makes sure that the *kuih bakar* premix satisfies modern consumer demands while preserving traditional authenticity by methodically integrating

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consumer preferences and expectations into the formulation process. This strategy fits well with the expanding consumer-driven food innovation trend, which gives convenience and market demands top priority when developing new products (Guerrero et al., 2009).

Examining the difficulties faced by producers when creating *kuih bakar* is another significant addition of this study. Making *kuih bakar* the old-fashioned way involves a lot of work and calls for precise ingredient ratios and cooking methods. This study finds key obstacles such ingredient accessibility, preparation complexity, and consistency in taste and texture through interviews with *kuih bakar* producers. The food sector may learn a lot from these findings, especially small and medium-sized businesses (SMEs) hoping to market heritage food items. While the majority of previous research on traditional food commercialisation has been on large-scale production, this study emphasises the challenges faced by small producers and provides a workable premix solution.

Additionally, this study promotes the use of response surface methodology (RSM) in the formulation of heritage foods. RSM is still not frequently employed in traditional Malaysian food premixes, despite being widely used in bakery and confectionery product optimisation. This study offers a scientifically verified formulation approach that guarantees product consistency and consumer approval by using RSM to optimise the concentrations of sugar and coconut milk powder based on consumer sensory preferences. This methodological contribution encourages future researchers to use comparable

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optimisation strategies, strengthening the scientific rigour of heritage food product development.

In summary, this research makes a considerable addition to both academic knowledge and the food sector by establishing a consumer-informed, scientifically optimised, and culturally genuine *kuih bakar* premix. It highlights the importance of merging consumer perceptions, producer issues, and scientific approaches in traditional food innovation. The results of this study offer a scalable option for the commercialisation of traditional Malaysian delicacies in addition to helping to preserve heritage foods. To further improve the availability and durability of traditional food products, future studies can build on this work by investigating other heritage foods and different ingredient formulations.

7.3 Knowledge, Methodological and Practical Implications

This research study is interdisciplinary between social science and technological science. Therefore, this study has implications and contributions to knowledge in these two fields. The current research findings provide insights regarding knowledge, methodological, and practical implications. These implications are important to indicate and highlight the contributions of this research to the current study.

This research bridges the gap between two domains to provide a thorough and comprehensive understanding of the research issue through its creative interdisciplinary study of social science and technological science studies.

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While social science investigates the cultural and behavioural elements that influence how people interact with food, technical science studies focus on the technical and scientific aspects of food product creation. Combining these fields can help us better understand how traditional foods, consumer preferences, and technological advancements interact (Simeone & Marotta, 2010).

7.3.1 Knowledge Implications

This research study is interdisciplinary between social science and technical science; hence, it is not a purely social science study where theories will be developed at the end of the research study. Instead, a food product was created at the end of this study, as the main objective of this research is to produce a consumer-led premix formulation of Malaysian heritage food, *kuih bakar.* Therefore, a tangible product which is *kuih bakar* premix was successfully created as the result and product of this research study.

The knowledge implications of this study are that, based on the findings, government bodies and agencies like the Malaysia External Trade Development Corporation (MATRADE), the Ministry of Science, Technology and Innovation (MOSTI), the Ministry of Agriculture and Food Security, and also industrial practitioners will benefit from the knowledge findings of this study. The findings regarding the consumers' preferences, expectations, and opinions regarding the heritage food, specifically traditional *kuih bakar* and *kuih bakar* premix, and also the findings regarding the producers' reasons for producing and selling *kuih bakar* and their challenges and opinions regarding

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kuih bakar premix. By understanding these findings and insights from the consumers and the experts themselves, it directly contributes to the invaluable knowledge that the authorities and industrial practitioners need to improve and develop a better heritage product so that these products will still be relevant in the future. Not only that, the focus group discussion with consumers and the in-depth interview with the experts were directly linked to the product that had been developed at the end of this research study. Though this study specifically focuses on the development of *kuih bakar* premix, the knowledge that it contributes is not only limited to the science and technology part but also the social science part, which involves understanding the consumers and also the experts by using qualitative methods. The knowledge implications of this research study were divided into three implications, as below:

a. Consumer preferences, expectations, and opinions of *kuih bakar* premix.

Gaining knowledge about consumer preferences might help one understand the market need for *kuih bakar* premix. For producers and enterprises to better match their products with consumer expectations and boost market acceptance, they need to know this information. The *kuih bakar* premix was developed with input from customers, guaranteeing that it satisfies contemporary tastes, cultural authenticity, and sensory expectations. This helps create a product that appeals to the intended market. A fuller comprehension of consumer behaviour in relation to traditional food products is made possible by insights into preferences and expectations.

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Understanding particular tastes improves *kuih bakar* premix's unique selling propositions by enabling it to stand out in the market.

b. Challenges in making *kuih bakar* based on producers' experiences and their opinions regarding *kuih bakar* premix.

Understanding the challenges that producers' experiences present chances to enhance operations. Overcoming these obstacles may result in improved product quality and more effective production procedures. The views of producers on *kuih bakar* premix can influence market positioning tactics. Gaining insight into their viewpoints facilitates the customisation of marketing strategies that align with the interests and values of producers. The challenges of producing *kuih bakar* and adjusting to premix formulations are made more feasible by gaining insight into producers' experiences. Knowing the difficulties encountered during production advances our understanding of the dynamics of the supply chain in the traditional food sector.

c. Optimum formulation for *kuih bakar* premix using response surface methodology

Response surface methodology is used to optimise the formulation of *kuih bakar* premix, improving sensory qualities and overall product quality. Reaching the ideal formulation increases manufacturing efficiency and lowers costs and waste of resources. Scientific understanding of how each ingredient interacts in conventional food items is aided by insights into the ideal composition. Understanding response surface methodology offers a framework for formulating other conventional food products more optimally.

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To sum up, this study has yielded a wealth of benefits and knowledge, including better market comprehension, refined product development strategies, operational enhancements for producers, insights into the dynamics of the supply chain, and scientific knowledge regarding conventional food formulation methods. This all-encompassing strategy advances both the knowledge comprehension of the sector and the real-world implementation in the marketplace and also by the government authorities.

7.3.2 Methodological Implications

The methodological implications of this research are that it gives new insights regarding the integration methods of social science and science technology in one research study. This research has proven that this type of research is possible to conduct, which is the integration of qualitative social science methods by understanding consumers and producers, as well as the science and technology of experimental studies of sensory and RSM, to develop the *kuih bakar* premix in the laboratory. Insights from both social and scientific viewpoints are needed to gain a comprehensive grasp of the research issue. It is acknowledged that integrating approaches from other disciplines can frequently be beneficial when addressing complicated research topics.

A thorough data collection was demonstrated by the employment of both scientific (sensory evaluation, response surface approach) and qualitative (in-depth interviews, focus groups) methodologies. With regard to the *kuih bakar* premix, this method captures both subjective perceptions and objective metrics. The acknowledgement that several data-gathering techniques are

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required for a comprehensive understanding of traditional food products is one of the methodological implications.

Through the integration of data from many sources (customer opinions, producer experiences, and sensory assessments), the study's design enables the triangulation of findings. This increases the study's resilience and dependability. Identification of the value of triangulation in reducing biases and offering more sophisticated and validated knowledge of the research issue are among the methodological ramifications.

In exploring the *kuih bakar* premix, the study attempts to strike a balance between scientific rigour and cultural authenticity by utilising both social science and scientific methodologies. Among the methodological ramifications is the understanding of how crucial it is to protect cultural assets while utilising scientific techniques. The methodological implications of this research study were divided into two specific points, as below:

d. Social science method of qualitative

The social and cultural context of *kuih bakar* premix is richly contextualised through the use of qualitative approaches, including focus groups and in-depth interviews. This covers information on the significance of culture, consumer trends, and the function of traditional foods in social contexts. Diverse stakeholder views, such as those of consumers and producers, were explored through qualitative approaches. A more complete understanding of the topic benefits from knowing their perspectives, experiences, and expectations.

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Recognising possible obstacles and market possibilities requires an understanding of the dynamics between producers and consumers.

e. Science and technology methods of sensory evaluation and response surface methodology

A methodical technique for comprehending how customers view the sensory qualities of *kuih bakar* premix is provided by sensory evaluation. Knowledge about the ways in which various sensory qualities impact consumer preferences was obtained through sensory evaluation. Adjustments to the formulation are guided by this information to match desired sensory profiles. Formulation optimisation is made possible through the scientific technique of response surface methodology. This results in more effective ingredient use, higher-quality products, and more streamlined production procedures. The application of the response surface methodology approach advances our understanding of food formulations and enables the understanding of ingredient interactions and their consequences for the finished product.

In conclusion, the social science approach to qualitative research offers insights into the social and cultural aspects of *kuih bakar* premix, such as stakeholder viewpoints and the dynamics between producers and consumers. On the other hand, the product's sensory qualities and formulation efficiency were acquired through science and technology methods like response surface methodology and sensory evaluation. The integration of these techniques guarantees a comprehensive comprehension of *kuih bakar* premix from both scientific and social viewpoints. This research study's methodological implications highlight the importance of an interdisciplinary, thorough, and

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balanced approach to data collection and analysis. The study acknowledges that, in order to effectively address the complex issues surrounding traditional food development, both qualitative and scientific insights are crucial.

7.3.3 Practical Implications

This research serves practical implications, as the *kuih bakar* premix itself is the developed product and application of this research. The beauty of doing interdisciplinary studies is that this research not only provides knowledge but also provides the readily successful product of this research, which has been proven by conducting sensory sessions with consumers. Therefore, this research is strong in its practicality in the sense that the product has already been successfully developed, which is *kuih bakar* premix. The data that the researcher gathered from the social science methods was transferred to the laboratory, and *kuih bakar* premix was developed. The methods and data were directly practical and tested in the laboratory. The industrial practitioners, including the government agencies, could use this *kuih bakar* premix as the basis for the development of other heritage foods.

Response surface methodology offers useful information for improving the way traditional recipes are formulated. By using this knowledge, traditional food producers and enterprises can maintain cultural authenticity while improving the sensory qualities and overall quality of their products.

The focus on a consumer-led strategy emphasises how crucial it is to include customers in the process of developing new products. From a practical

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standpoint, this suggests that companies can gain from actively identifying and taking into account customer preferences, guaranteeing that the finished product is in line with market expectations and preferences.

Gaining a practical understanding of consumer preferences and updating classic recipes to suit modern tastes might help expand the market. Producers might potentially expand the market and enhance the overall attractiveness of these items by using this information to introduce traditional cuisine to new consumer segments.

The study's understanding of *kuih bakar*'s cultural relevance adds to the actual promotion of cultural heritage. Government bodies and businesses can use this information to support and promote traditional foods as cultural assets that strengthen community relationships and build a sense of pride.

This research provides useful advice for producers involved in traditional foods' businesses by considering seller experiences. Food entrepreneurs looking to expand and maintain operations might benefit from having insights into industry trends, best practices, and customer expectations. The research findings can be directly applied by food sector businesses to help them make educated decisions about product development, marketing tactics, and budget allocation. Comprehending the cultural and sensory aspects of customary cuisine offers a comprehensive foundation for making strategic choices.

In the context of cuisine, the research acts as a useful link between tradition and modernity. It offers a useful example for companies juggling the delicate

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balance between tradition and innovation by showing how traditional foods may be updated to suit modern tastes without losing their cultural identity.

Essentially, this research study's practical implications include recipe optimisation, consumer-driven product development, market expansion, the promotion of cultural heritage, advice for food producers, well-informed business decision-making, and the harmonious fusion of tradition and modernity in the food industry.

7.4 Research Limitations

Despite this research's thorough approach, a number of limitations should be noted. The sample size and demographic representation are two important limitations. The sample may not accurately reflect Malaysia's diverse population, despite the fact that the study included focus group discussions (FGDs) with 62 consumers and interviews with six *kuih bakar* manufacturers. Prior research has demonstrated that demographic variables including age, cultural background, and geographic location can have a substantial impact on customer preferences (Jaeger, 2006). The findings may not be as generalisable if urban and rural populations have different preferences for *kuih bakar* premix. To guarantee wider applicability, future studies should take into account a larger and more varied sample.

The qualitative nature of the research's early phases is another limitation. Qualitative data can be subjective and impacted by interviewer bias or group dynamics, even while focus groups and interviews offer insightful information

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(Creswell & Poth, 2018). The study could have profited from a complementary quantitative strategy, such as structured consumer surveys with statistical validation, even if thematic analysis was utilised to find patterns (Cicia et al., 2021). A mixed-methods approach would improve the reliability of results and offer a more thorough knowledge of customer attitudes.

Since sensory perception is subjective by nature and impacted by variables including mood, health, and preexisting expectations, the sensory evaluation sessions with 52 panellists also have limitations. Individual differences in taste preferences may have an impact on the outcomes, even if the response surface methodology (RSM) optimised the *kuih bakar* premix formulation based on quantifiable sensory qualities. The resilience of the optimised formulation would be confirmed by repeated sensory assessments in various consumer segments and geographical areas (Stone et al., 2012).

The short-term product testing done during the study is another limitation. The study did not assess long-term consumer retention, shelf-life stability, or market demand over time; instead, it concentrated on instant sensory acceptance A longitudinal study could offer more profound insights on customer loyalty and the demands for product enhancement, as prior research has demonstrated that consumer satisfaction changes with repeated product use (Kühne et al., 2010). In order to evaluate the commercial viability of *kuih bakar* premix after first trials, future study should investigate storage conditions, packaging innovations, and purchase behaviours.

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Last but not least, time and resource limitations restricted the study's capacity to examine other elements like price sensitivity, marketing strategies, and cross-cultural acceptability. A more thorough investigation into branding and product positioning could improve the commercialisation approach even more, even though consumer-led product development is crucial for guaranteeing market success. According to earlier studies, consumer perception and successful product branding are important factors in the uptake of new food innovations (Albertsen et al., 2020). Future studies could improve *kuih bakar* premix's strategic market debut by addressing these limitations and making sure it satisfies both contemporary consumer demands and traditional expectations.

7.5 Recommendations for Future Research

Several important recommendations that could direct and enhance future research endeavours in the areas of traditional foods, culinary innovation, and consumer preferences arise in light of the complete findings and insights gained from the current research study.

It is suggested that in the future, more research regarding the innovation of other heritage foods could be conducted so that more heritage foods could be sustained according to the dynamics of the modern world. It is important to conduct this kind of research so that more heritage foods are known and stay relevant in the future, especially for the younger generation.

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Furthermore, it is recommended that in the future, research regarding the marketability and continuity of the significance of *kuih bakar* premix in the market will be studied. This is to make sure that *kuih bakar* premix is always up-to-date with consumers' tastes and preferences.

It is suggested that more research in qualitative and quantitative studies in regards to understanding consumers' preferences needs to be conducted. This is important due to the fact that consumers are the main reason for researchers to develop a new product. Customers are always the utmost priority in any business.

These suggestions, taken as a whole, highlight the diversity of research prospects in the field of traditional foods and culinary innovation. By focusing on these topics, scientists may continue to understand the complex interactions between tradition and modernity, ensuring the preservation, adaptation, and enjoyment of culinary heritage in a world gastronomic scene that is constantly changing. It is hoped that more research using an interdisciplinary approach combining social science and science methods will become more popular in the future. This is because this kind of research could result in a better outcome, especially in understanding the research subjects in deeper contexts.

7.6 Conclusion

This study emphasises how crucial it is to combine consumer feedback with scientific innovation in order to modernise traditional food products without

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sacrificing cultural authenticity. One example of how traditional foods can be modified to satisfy modern needs while maintaining their legacy is the creation of a consumer-led *kuih bakar* premix formulation. This research offers guidance and information for the modernisation of heritage foods by taking into account consumer preferences, addressing producer challenges, and optimising formulation through scientific approaches. The results support the notion that, in order to preserve traditional flavours in changing food markets, customer demands and cultural relevance should also be taken into consideration when developing new food products.

The study creates a guide for connecting traditional and modern food systems, which goes beyond the creation of a particular product. It illustrates how scientific formulation and consumer involvement may bring traditional foods which are frequently thought of as labour-intensive and niche back into the mainstream. A comprehensive approach to food product innovation is offered by the inclusion of focus group discussions, producer interviews, and sensory evaluation sessions, which guarantee that the premix satisfies consumer expectations and industry viability. This study demonstrates how cooperative research initiatives among producers, consumers, and food scientist can result in sustainable food innovations that support the preservation of cultural heritage while also benefiting the sector.

Additionally, this study adds to the current discussion on the commercialisation, convenience, and sustainability of food. This research promotes the preservation of traditional flavours in a format that works for

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contemporary lifestyles by developing a premix that makes traditional food preparation easier. Small and medium-sized businesses (SMEs) may benefit from the commercialisation of traditional food premixes by being able to increase production without sacrificing authenticity and quality. This strategy supports international initiatives to maintain culinary traditions in a quickly changing food business, demonstrating that traditional foods may be creatively recreated and yet be relevant.

More generally, this study shows how organised scientific methods can be used to revitalise traditional foods. Modern food formulation methods combined with consumer-driven product development show that heritage foods can be modified without losing their authenticity. This study also highlights how crucial it is to work with stakeholders along the food supply chain to make sure that new product developments satisfy the needs of both consumers and business experts. Future studies on modernising other traditional cuisines are encouraged by the findings, which will increase the potential for product development that is both market-driven and culturally significant.

To sum up, this study provides a roadmap for the sustainable modernisation of traditional foods, highlighting the importance of industrial cooperation, scientific formulation, and consumer feedback in influencing upcoming food developments. In addition to preserving a popular Malaysian heritage dish, this research shows how traditional culinary techniques may adapt to shifting consumer preferences and market trends by creating a consumer-led *kuih*

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bakar premix. To ensure that cultural culinary heritage thrives in modern markets, the study's findings offer insightful information to food scientists, producers, and legislators who are interested in bridging the gap between tradition and modernity.

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APPENDICES

Appendix A

FGD Session Advertisement

Participant Wanted!

Participants needed for a 'focus group discussion' regarding Malaysian heritage food, *kuih bakar*.

Kuih bakar

Participant must comply to all of these characteristics:

- **Age of 20- 60 years old**
- **Familiar with Malay traditional *kuih***
- **Resides in the urban area (example: Klang Valley, Johor Bahru etc.)**
- ***Kuih bakar* is one of your favourite Malaysian heritage foods**
- **Baking cakes and/ or *kuih* at home**
- **Consumer of *kuih bakar***
- **Consumer of instant food products (example: instant cake mixes, instant premix soup, instant noodle, etc.)**
- **Interested in sustaining Malay heritage foods**
- **Interested in food innovation**

- **Where?**
  Jalamas meeting room, Food 1, Faculty of Food Science & Technology, UPM.
- **When?**
  27th March 2019 (Wednesday).
- **Time?**
  10.00 a.m. – 1.00 p.m.

✓ **RM50 in cash will be given as token of appreciation.**
✓ **Refreshments will be provided during coffee break.**

Interested?
Please kindly contact Naili for RSVP.

H/p: [redacted]
(WhatsApp/ call/ message)

E-mail:
[redacted]

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Appendix B

Consent form for FGD Participant

Written Consent Form

Project Title: Exploration and Experimental Study of Consumer-Led Food Product Development for Premix Formulation of Malaysian Heritage Food *Kuih Bakar*

Researcher: Naili Binti Nahar, PhD Student of Food Service Management, Universiti Putra Malaysia

Purpose: To explore the consumer preferences, expectations and opinions of *kuih bakar* premix.

Procedures:
I would require a 3-hour voluntary commitment of your time to participate in this semi-structured discussion. You will be asked to respond to up to 25 questions related to the study objectives. Your ideas, comments, and suggestions are extremely important to the findings of this study.

Risks of Participation:
"There are no known risks associated with this project which are greater than those ordinarily encountered in daily life."

Benefits:
There are no personal direct benefits to you for participating in this study. Your valuable input will provide important insight for the study.

Confidentiality:
Your contribution will be recorded in writing and taped. The data collected will be transcribed in electronic format and will be archived in a retrieval system. Your personal identities will be kept confidential and will only be known to each other in the group and to the researcher. There are no foreseeable risks related to participating in this study. "The UPM authority has the authority to inspect consent records and data files to insure compliance with approved procedures".

Contacts: For information about your rights as a subject, please contact Prof. Dr Muhammad Shahrim Abd Karim at Department of Food Service and Management, Faculty of Food Science and Technology, Universiti Putra Malaysia, contact email: shahrim@upm.edu.my

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Participant Rights: Your participation is totally voluntary and can be discontinued by you at any time without reprisal or penalty.

Signatures:

I, _____, I.C. number _____ have read and fully understand the consent form.
I sign it freely and voluntarily.

_____ _____
Signature of participant Date

I, Naili Binti Nahar, the researcher, certify that I have personally explained this document before requesting that the participant sign it.

_____ _____
Naili Binti Nahar Date

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Appendix C

FGD Protocol with Consumers

Focus Group Discussion Protocol with Consumers

Opening Outline

Good morning/ good evening and welcome. Thanks for taking the time to join our discussion on Innovation of Malaysian heritage food, *kuih bakar*. My name is Naili, the moderator for today's discussion.

The purpose of the discussion is to explore and discover the attributes and characteristics of innovated *kuih bakar* preferred by the consumers. (Distribute the consent forms and demographic questionnaires)-first of all please fill in the consent form and questionnaire.

Let me explain the guidelines of the discussion.

- No right or wrong answers, only differing points of view. Please feel free to share your point of view even if it differs from what others have said.
- You don't need to agree with each other, but you should listen respectfully while others share their views.
- I will be tape-recording our discussion while simultaneously carrying an attentive discussion with all of you.
- Later the tapes will be transcribed; however, your names will not be attached to any of your comments. We will refer to each person as participant.
- I also ask that you hold the conversation today in confidence and that you treat each other's comments with respect.
- Since I'm taping, it will be very helpful to have only one person speaks at a time.
- If any of you have hand phones, I ask that you turn them off or in silent mode. If you cannot, and must respond to a call, we ask you to do so as quietly as possible and re-join the group as quickly as you can.

- Our discussion will last about 2 hours.
- My role as moderator will be to guide the discussion.
- It is important that you talk with each other. I'm interested in hearing from each one of you. So, if you are talking a lot, I may ask you to give others a chance. And, if you aren't saying much, I may call on you. I'm just wanted to make sure we hear from all of you.
- Feel comfortable to speak freely in English and Bahasa Melayu, whichever language that you feel you can express and explain the most regarding the topic.
- Feel free to get up and get more refreshments. The restroom is on your right- just outside of this room.
- Please use the paper given to write your answers. This paper will be collected in the end of the discussion for the research purpose.
- As I mentioned, the purpose of our discussion today is to explore and discover the attributes and characteristics of innovated *kuih bakar* preferred by the consumers.
- What I'd like to do to begin is to go around the table and have everyone quickly introduce themselves by saying your name, age and where you currently staying and working?

Question – Open Ended

1) Traditional *kuih* has become less popular nowadays, however it is believed that traditional *kuih* is still relevant in this modern era.
Out of many existed kuih, what are your favourites traditional *kuih*?
-Why do you like that *kuih*?

-What are the important features that you think traditional *kuih* should have? Can you please explain further, why?
- Do you know what is *kuih bakar*? Please describe something about *kuih bakar*?

-What do you think about *kuih bakar*? In your opinion, what makes *kuih bakar* different from other *kuih*?

-What is an authentic *kuih bakar* from your perspective? Why do you think that characteristics are authentic?

2) There are varieties of foods that are being sold in the market. Many kinds of innovative traditional foods existing in the market.
What do you think of the idea of doing innovation on *kuih bakar*? (30 minutes)

-What characteristics that you would like to see in an innovated *kuih bakar*?

-Do you like the pandan flavor of the *kuih bakar*? If I'm going to change the flavor into new flavor, what flavor would be suitable for innovated *kuih bakar*? Can you please give me your opinion regarding this?

-Can you please explain what is your opinion on the original colour of the traditional *kuih bakar*?
-Do you think that if the colour is different, would you buy it? What colour do you prefer for the innovated *kuih bakar*?

-Do you like the current texture of *kuih bakar*? If I'm planning to change the texture, what kind of texture suits with innovative *kuih bakar*?

-What do you think of the original size of *kuih bakar*? What kind of size do you prefer? Please share your preference.

-What do you think of the traditional shape of *kuih bakar*? If I'm going to innovate the shape, what do you think? Can you please share your idea and opinion of your preferred shape?

3) People nowadays are busy especially those reside in the urban area, therefore they don't have much time to prepare foods at home.
What do you think of an instant or convenience traditional *kuih*?

-Are there any convenience *kuih* that you usually buy at the market? Can you explain further, why do you prefer that convenience *kuih*?

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-Have you ever bought any instant *kuih bakar* or *kuih bakar* mix in the market? -Let's imagine we want to make instant *kuih bakar*, would you be interested to buy? Can you please explain why? -In your opinion, by developing convenience traditional *kuih* such as instant *kuih bakar* will it help to sustain the traditional *kuih* in the future?
4) Most of the instant products in the market use different types of method of preparations. Such as instant mix for cakes, the usual method of preparation is by baking using oven or microwave. **For instant mix *kuih bakar*, what is the method of preparation that you prefer?** -How many minutes of preparation do you prefer? -How long of shelf life do you expect for instant mix *kuih bakar*? -For instant mix products, especially *kuih bakar* instant mix, how many pieces of *kuih* do you expect to produce from the instant mixture?
5) We have come to end of our discussion, before I end the session, do any of you have anything to share, add or discuss regarding our discussion from early on until now? Please feel free to speak. Thanks for coming today.

Reviewed and approved by: Prof Dr. Muhd. Shahrim Ab. Karim

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Appendix D

Socio-Economic Profiles Questionnaire

Dear Participant,
Thank you for taking the time to complete this questionnaire. Your responses will help in understanding the demographic characteristics of participants in this research. All information provided will remain confidential and be used for research purposes only.

1. **What is your age?**
   ☐ 25 to 29 years old
   ☐ 30 to 34 years old
   ☐ 35 to 39 years old
   ☐ 40 to 44 years old
   ☐ 45 to 49 years old
   ☐ 50 to 54 years old

2. **What is your gender?**
   ☐ Male
   ☐ Female

3. **What is your marital status?**
   ☐ Single
   ☐ Married
   ☐ Divorced

4. **What is your educational level?**
   ☐ SPM (Secondary School)
   ☐ Diploma
   ☐ Bachelor's Degree
   ☐ Master's Degree
   ☐ PhD

5. **What is your monthly income?**
   ☐ Less than RM1000
   ☐ RM1000 to RM2000
   ☐ RM2001 to RM3000

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☐ RM3001 to RM4000
☐ RM4001 to RM5000
☐ RM5001 to RM6000
☐ RM6001 to RM7000
☐ RM7001 to RM8000

6. **What is your baking frequency?**

☐ 1 time per year
☐ 2 times per year
☐ 3 times per year
☐ 4 times per year
☐ 5 times per year
☐ 1 time per month
☐ 2 times per month
☐ 3 times per month
☐ 4 times per month
☐ 5 times per month

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Appendix E

Socio-Economic Details of 62 FGD Participants

Group	No.	Age	Gender	Marital status	Occupation	Education level	Monthly income	Baking frequency
1	1	32	Female	Single	Self-employed	Diploma	RM2001-RM3000	3 times per month
1	2	26	Female	Single	Postgraduate student	Master's degree	RM2001-RM3000	2 times per month
1	3	26	Female	Single	Postgraduate student	Master's degree	RM2001-RM3000	1 time per year
1	4	34	Female	Married	Lecturer	Master's degree	RM4001-RM5000	1 time per month
1	5	25	Female	Single	Research Officer	Master's degree	RM3001-RM4000	1 time per year
1	6	29	Female	Married	Lecturer	PhD	RM6001-RM7000	5 times per year
1	7	32	Female	Married	Housewife	Master's degree	RM2001-RM3000	1 time per month
1	8	31	Female	Single	Lecturer	PhD	RM7001-RM8000	3 times per year
1	9	41	Female	Married	Research Officer	PhD	RM5001-RM6000	2 times per month
1	10	31	Female	Married	Researcher	Master's degree	RM2001-RM3000	2 times per month
1	11	25	Female	Single	Postgraduate student	Bachelor's degree	RM1000-RM2000	3 times per year
2	12	40	Female	Married	Lecturer	Master's degree	RM4001-RM5000	5 times per year
2	13	32	Female	Married	Postgraduate student	Master's degree	RM1000-RM2000	5 times per year
2	14	36	Female	Married	Lecturer	PhD	RM6001-RM7000	5 times per year
2	15	31	Female	Single	Lecturer	PhD	RM6001-RM7000	1 time per year
2	16	28	Female	Single	Postgraduate student	Master's degree	RM1000-RM2000	4 times per year
2	17	28	Female	Single	Researcher	Master's degree	RM2001-RM3000	1 time per year
2	18	29	Female	Single	Postgraduate student	Master's degree	RM1000-RM2000	5 times per year
2	19	35	Female	Married	Housewife	Master's degree	RM1000-RM2000	4 times per month
2	20	35	Female	Married	Housewife	Master's degree	RM1000-RM2000	2 times per year
2	21	32	Female	Married	Lecturer	Master's degree	RM4001-RM5000	1 time per month
2	22	31	Female	Married	Researcher	Master's degree	RM2001-RM3000	2 times per year
2	23	36	Female	Married	Housewife	Master's degree	RM1000-RM2000	5 times per year
3	24	40	Female	Married	Assistant Officer	Diploma	RM2001-RM3000	2 times per month
3	25	39	Male	Married	Assistant Officer	Diploma	RM4001-RM5000	3 times per year
3	26	28	Female	Single	Postgraduate student	Master's degree	RM1000-RM2000	5 times per year
3	27	30	Male	Single	Lecturer	Master's degree	RM2001-RM3000	4 times per month
3	28	29	Male	Single	Researcher	Master's degree	RM2001-RM3000	2 times per year
3	29	29	Male	Single	Postgraduate student	Bachelor's degree	RM1000-RM2000	2 times per year
3	30	27	Female	Single	Executive	Master's degree	RM3001-RM4000	1 time per month
3	31	27	Female	Single	Executive	Master's degree	RM3001-RM4000	1 time per month
3	32	32	Female	Married	Housewife	Master's degree	RM1000-RM2000	2 times per month
3	33	28	Female	Married	Housewife	Bachelor's degree	RM1000-RM2000	4 times per year
4	34	36	Male	Single	Lecturer	PhD	RM6001-RM7000	3 times per year
4	35	33	Male	Single	Postgraduate student	Master's degree	RM1000-RM2000	1 time per year
4	36	45	Female	Married	Secretary	Diploma	RM3001-RM4000	2 times per month
4	37	27	Female	Single	Executive	Bachelor's degree	RM2001-RM3000	1 time per year
4	38	25	Female	Single	Postgraduate student	Bachelor's degree	RM1000-RM2000	1 time per year
4	39	25	Female	Single	Postgraduate student	Bachelor's degree	RM1000-RM2000	2 times per month
4	40	25	Female	Single	Postgraduate student	Bachelor's degree	RM1000-RM2002	4 times per year
4	41	43	Female	Married	Assistant Science Officer	Bachelor's degree	RM2001-RM3000	2 times per month
4	42	32	Female	Married	Assistant Officer	Diploma	RM1000-RM2000	2 times per year
4	43	38	Female	Married	Medical Assistant	SPM	RM1000-RM2000	2 times per year

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Group	No.	Age	Gender	Marital status	Occupation	Education level	Monthly income	Baking frequency
5	44	36	Female	Married	Medical Lab Technologist	Diploma	RM4001-RM5000	1 time per year
5	45	37	Male	Married	Mechanical Engineer	Bachelor's degree	RM4001-RM5000	1 time per year
5	46	40	Female	Married	Assistant Officer	SPM	RM3001-RM4000	1 time per month
5	47	35	Female	Married	Executive	Bachelor's degree	RM2001-RM3000	3 times per month
5	48	44	Female	Married	Assistant Administrative	Diploma	RM2001-RM3000	1 time per month
5	49	45	Female	Married	Assistant Science Officer	SPM	RM2001-RM3000	5 times per year
5	50	38	Female	Married	Asistant Science Officer	Diploma	RM3001-RM4000	4 times per month
5	51	34	Female	Married	Assistant Administrative	Diploma	RM1000-RM2000	1 time per month
5	52	36	Female	Divorcee	Assistant Administrative	Bachelor's degree	RM2001-RM3000	2 times per month
5	53	42	Female	Married	Lecturer	Bachelor's degree	RM4001-RM5000	2 times per month
6	54	32	Female	Married	Assistant Lecturer	Master's degree	RM2001-RM3000	3 times per year
6	55	35	Female	Single	Lecturer	Master's degree	RM5001-RM6000	2 times per year
6	56	27	Female	Single	Research Assistant	Bachelor's degree	RM1000-RM2000	3 times per year
6	57	27	Female	Single	Postgraduate student	Bachelor's degree	RM1000-RM2000	3 times per year
6	58	40	Female	Married	Assistant Administrative	SPM	RM3001-RM4000	2 times per month
6	59	46	Female	Married	Self-employed	Master's degree	RM5001-RM6000	1 time per year
6	60	54	Female	Married	Housewife	Bachelor's degree	<RM1000	5 times per month
6	61	28	Female	Single	Medical Assistant	Diploma	RM1000-RM2000	1 time per month
6	62	38	Female	Married	Medical Assistant	SPM	RM1000-RM2000	1 time per month

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Appendix F

Consent form for Interview Session with *Kuih Bakar* Producers

Written Consent Form

Project Title: Exploration and Experimental Study of Consumer-Led Food Product Development for Premix Formulation of Malaysian Heritage Food *Kuih Bakar*

Researcher: Naili Binti Nahar, PhD Student of Food Service Management, Universiti Putra Malaysia

Purpose: To discover the challenges in making *kuih bakar* based on producers' experiences and their opinions regarding *kuih bakar* premix.

Procedures:
I would require a 2-hour voluntary commitment of your time to participate in this semi- structured interview. You will be asked to respond up to thirty questions related to the study objectives. Your ideas, comments and suggestions are extremely important to the findings of this study.

Risks of Participation:
"There are no known risks associated with this project which are greater than those ordinarily encountered in daily life."

Benefits:
There are no personal direct benefits to you for participating in this study. Your valuable input will provide important insight for the study.

Confidentiality:
Your contribution will be recorded in writing and taped. The data collected will be transcribed in electronic format and will be archived in a retrieval system. Your personal identities will be kept confidential. There are no foreseeable risks related to participating in this study. "The UPM authority has the authority to inspect consent records and data files to ensure compliance with approved procedures".

Contacts: For information about your rights as a subject, please contact Prof. Dr. Muhammad Shahrim Abd Karim at Department of Food Service and Management, Faculty of Food Science and Technology, Universiti Putra Malaysia, contact email: shahrim@upm.edu.my

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Participant Rights: Your participation is totally voluntary and can be discontinued by you at any time without reprisal or penalty.

Signatures:

I, _____, I.C. number _____ have read and fully understand the consent form. I sign it freely and voluntarily.

_____ _____

Signature of participant Date

I, Naili Binti Nahar, the researcher, certify that I have personally explained this document before requesting that the participant sign it.

_____ _____

Naili Binti Nahar Date

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Appendix G

Interview Protocol with *Kuih Bakar* Producers

Interview Protocol with *Kuih Bakar* Producers

A. Challenges in making *kuih bakar (Cabaran dalam membuat kuih bakar)*

1) Why do you choose to sell *kuih bakar*? *Kenapa puan memilih untuk menjual kuih bakar?*

2) How many years have you sold *kuih bakar*? *Dah berapa tahun puan menjual kuih bakar?*

3) What are the main challenges in making *kuih bakar*? *Apakah cabaran utama dalam pembuatan kuih bakar?*

4) What are the difficulties in getting the ingredients for making *kuih bakar*? *Susah tak puan nak dapatkan bahan-bahan untuk membuat kuih bakar?*

5) What is the most important ingredient in making *kuih bakar*? *Apakah bahan paling penting dalam pembuatan kuih bakar?*

6) Do you use pandan leaves or artificial flavours as a flavouring in *kuih bakar*? Why? *Adakah puan menggunakan daun pandan atau perasa tiruan sebagai perasa dalam kuih bakar? Kenapa?*

7) Do you use the artificial green colouring in *kuih bakar*? Why? *Adakah puan menggunakan pewarna hijau tiruan? Kenapa?*

8) What are the problems faced during the *kuih bakar* making? *Apakah masalah yang puan hadapi dalam penyediaan kuih bakar?*

9) What is the egg's grade used in *kuih bakar*? Why? *Apakah gred telur yang digunakan? Kenapa?*

10) What is the method of baking used? Why? *Apakah cara bakar yang digunakan? Pakai oven? Kenapa memilih cara penyediaan demikian?*

11) How many pieces of *kuih bakar* made for a day? *Berapa biji kuih yang dibuat untuk sehari?*

12) How many pieces sold for a day? *Biasanya sehari dapat jual berapa biji?*

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B. Opinions about *kuih bakar* pre-mix *(Pendapat mengenai kuih bakar pracampur)*

1) What do you think of an instant traditional *kuih*? *Apakah pendapat anda mengenai kuih tradisional segera?*

2) Have you ever used any pre-mixed products, such as pre-mix cake and pre-mix pancakes? *Pernahkah anda menggunakan sebarang produk pra-campuran, contohnya seperti kek pre-mix dan lempeng pre-mix?*

3) Have you ever bought any instant *kuih bakar* or *kuih bakar* pre-mix in the market? *Pernahkah anda membeli sebarang kuih bakar segera atau kuih bakar pra-campuran segera di pasaran?*

4) Let's imagine if I want to make *kuih bakar* pre-mix, would you be interested to buy? Can you please explain why? *Bayangkan jika saya ingin membuat kuih bakar pra-campuran segera adakah anda berminat untuk membelinya? Bolehkah anda jelaskan mengapa?*

5) In your opinion, does *kuih bakar* pre-mix will make the *kuih bakar*-making easier? *Pada pendapat anda, adakah kuih bakar pre-mix akan membantu memudahkan pembuatan kuih bakar?*

6) For *kuih bakar* pre-mix, what is the method of preparation that you prefer? *Untuk kuih bakar pra-campuran segera (pre-mix), apakah cara penyediaan yang menjadi pilihan anda?*

7) How many minutes of preparation do you prefer? *Berapa minit penyediaan yang anda rasakan sesuai?*

8) How long of shelf life do you expect for *kuih bakar* pre-mix? *Berapa lama jangka hayat yang anda harapkan untuk pra-campuran (pre-mix) kuih bakar?*

9) For *kuih bakar* pre-mix, how many pieces of *kuih* do you expect to produce from one mixture? *Untuk kuih bakar pre-mix, berapa biji kuih yang anda harapkan dapat dihasilkan dari 1 bancuhan?*

10) What kind of packaging do you prefer for *kuih bakar* pre-mix? *Apakah jenis pembungkusan yang menjadi pilihan anda untuk kuih bakar pra-campuran (pre-mix)?*

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11) How many packets of pre-mix do you prefer for one box of *kuih bakar* pre-mix? *Berapa banyak paket yang anda inginkan di dalam satu kotak kuih bakar pre-mix?*

12) What is the suitable price for one box of *kuih bakar* pre-mix*? Apakah harga yang sesuai untuk satu kotak kuih bakar pra-campuran (pre-mix)?*

Reviewed and approved by: Prof. Dr. Muhd. Shahrim Ab. Karim

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Appendix H

Sensory Session Advertisement

Sensory panellist wanted!

Panellists needed for sensory evaluation sessions of *kuih bakar*.

Kuih bakar

✓ **Token of appreciation RM5 in cash will be given**

Interested?
Please come and join us!

- **Sensory room, Food 3, Faculty of Food Science & Technology, UPM**
- **2nd September 2020 (Wednesday) & 4th September 2020 (Friday); choose either date**
- **9.00 a.m. – 2.00 p.m.**

nail
H/p:

Appendix I

Sensory Questionnaire

SENSORY EVALUATION OF KUIH BAKAR

Panel No: _____ Gender: _____ Age: _____ Date: _____

- Please rinse your mouth with the provided water bottle before tasting each sample.
- Evaluate the sample in front of you by looking at it and tasting it.
- Please indicate how much you LIKE or DISLIKE the samples. Circle the number that represents your response.

Sample code:

1. Do you like the **colour** of this kuih bakar?

1	2	3	4	5	6	7	8	9
Dislike extremely				Neither like/ nor dislike				Like extremely

2. Do you like the **flavour** of this kuih bakar?

1	2	3	4	5	6	7	8	9
Dislike extremely				Neither like/ nor dislike				Like extremely

3. Do you like the **crunchiness** of this kuih bakar?

1	2	3	4	5	6	7	8	9
Dislike extremely				Neither like/ nor dislike				Like extremely

4. Do you like the **chewiness** of this kuih bakar?

1	2	3	4	5	6	7	8	9
Dislike extremely				Neither like/ nor dislike				Like extremely

5. Do you like the **creaminess** of this kuih bakar?

1	2	3	4	5	6	7	8	9
Dislike extremely				Neither like/ nor dislike				Like extremely

6. Do you like the **sweetness** of this kuih bakar?

1	2	3	4	5	6	7	8	9
Dislike extremely				Neither like/ nor dislike				Like extremely

7. What is your rating for **overall acceptability** of this kuih bakar?

1	2	3	4	5	6	7	8	9
Dislike extremely				Neither like/ nor dislike				Like extremely

BIODATA OF STUDENT

Naili binti Nahar was born on 11th of December 1989, in Klang, Selangor, Malaysia. She started her primary education at SK Convent (2) Klang. Then, she continued her secondary education at SMK Convent Klang. After completing her secondary education, she continued her pre-university study in Matriculation of Science (major in Physics) at Johor Matriculation College.

She received her first degree in Bachelor of Science (Food Studies) from Universiti Putra Malaysia. During her bachelor's degree final year study, she did her full-time internship for 6 months as a Quality Assurance Intern at Cadbury Confectioneries (Mondelēz International).

After graduating from her bachelor's degree, she continued her master's degree in Master of Science (Food Quality and Innovation) at the University of Leeds, United Kingdom. During her master's degree, she received an award from the School of Food Science and Nutrition, University of Leeds, for 'Best Master of Science Industrial Project'.

After completing her master's degree in 2014, she worked for a food company as an Executive. Currently, she is still working in the food industry as an Assistant Manager at a multinational company (MNC) while completing her PhD study.

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LIST OF PUBLICATIONS

Nahar, N., Karim, S.A., Karim, R., Ghazali, H. & Krauss, S.E. (2018). The Globalization of Malaysia National Cuisine: A Concept of 'Gastrodiplomacy'. *Journal of Tourism, Hospitality & Culinary Arts,* 10(1), 42-58. (MyCite, Open Access)

Nahar, N., Madzuki, I. N., Izzah, N. B., Karim, S. A., Ghazali, H. M., & Karim, R. (2019). Bakery Science of Bread and the Effect of Salt Reduction on Quality: A Review. Borneo Journal of Sciences and Technology, 1(1), 9-14. (MyCite, Open Access).

Nahar, N., Krauss, S. E., Karim, R. & Karim, S.A., (2025). Exploring Idea Generation for Premix Development of Heritage Food: Insights from Consumers. (Submitted)

Nahar, N., Krauss, S. E., Karim, R. & Karim, S.A., (2025). Discovery on the Challenges in Making Heritage Food: A Qualitative Approach. (Submitted)

Conference

1. Delegate at 14th Pangborn Sensory Science Symposium 'Sustainable Sensory Science' Online: Live and On-demand by Elsevier Ltd (August 2021)

2. Oral presenter at 9th International Qualitative Research Conference (IQRC 2019) by Qualitative Research Association Malaysia in Bangi Resort Hotel, Selangor, Malaysia (October 2019).

3. Participant at *Simposium Makanan Warisan 2019* (Heritage Food Symposium 2019) by Universiti Teknologi Mara in Universiti Teknologi Mara, Shah Alam, Selangor, Malaysia (April 2019).

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