



UNIVERSITI PUTRA MALAYSIA

***CONSUMERS' PREFERENCES FOR PERCEPTUAL AND SENSORY
ATTRIBUTES OF CHICKEN MEAT IN MALAYSIA***

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FP 2015 28



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ATTRIBUTES OF CHICKEN MEAT IN MALAYSIA**

By

SITI NASIHAH BINTI IMRAN

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in
Fulfilment of the Requirements for the Degree of Master of Science**

June 2015

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DEDICATION

I dedicate this **DIAMOND** to my loving parents and husband

Imran bin Hashim

Yong Sabariahbinti Abdul Manan

Ahmad Syafiq bin Hamzah

You are special **gift** to me. I will always be proud to be your daughter and wife.

2015

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

CONSUMERS' PREFERENCES FOR PERCEPTUAL AND SENSORY ATTRIBUTES OF CHICKEN MEAT IN MALAYSIA

By

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June 2015

Chairman : Associate Professor Nitty Hirawaty Kamarulzaman, PhD
Faculty : Agriculture

Meat plays an important role in a balanced diet as a source of protein intake. Since the demand for chicken meat is high among consumers, many producers try to meet this demand by producing a fast-growing chicken by increasing the efficiency of their production through enhancing genetics, management, housing environment, nutrition, and animal health. The increasing consumer awareness of health issues has caused them to be very sensitive on food consumption. Meat consumption patterns have a significant effect on the changes in consumer demand for meat. The increasing rate of female labour force participation, improved per capita income, rising rate of urbanization, as well as lifestyle changes resulting in urbanization are predicted to further increase the demand for quality meat in the country. For most consumers, sensory characteristics like appearance, texture, odour, and flavour are the initial preference criteria when purchasing chicken meat. Now, consumers have greater choices for different types of chicken meat in the market. Consumers' preference depends to the best quality of chicken meat based on sensory characteristics. Thus, the objective of this study was to determine consumers' preference towards different types of chicken meat based on sensory characteristics.

Sensory evaluation was used to analyse the characteristics among four different types of chicken meat namely commercial broiler chicken, commercial village chicken [intensive], village chicken [semi-intensive], and herbal organic chicken. Face-to-face interviews were carried out at the Central Location Place with 569 consumer panels. Stratified sampling method was used to select the targeted respondents. Consumers' acceptance and preference on chicken meat were based on a 9-point hedonic scale ranging from 1 (dislike extremely) to 9 (like extremely), while consumers' perception on chicken meat was based on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Data was analysed using descriptive analysis, analysis of variance (one-way ANOVA), chi-square analysis, mean ranking analysis, factor analysis, and logistic regression.

Based on the results of descriptive analysis, majority of the respondents were female, married, age between 18 years old to 30 years old. Most of the respondents were Malay, Muslim, and originated from the Central Zone area. Most of them have less than six numbers of household, were degree holders, had working experience in the

private sector, and earned monthly income between RM1,001 to RM3,000. In general, consumers consumed chicken at least two to three times per week and the most preferred chicken meat was commercial broiler chicken.

The findings based on the analysis of variance (one-way ANOVA) indicated that most of the consumers preferred moderately light colour herbal organic chicken, and slightly weak chicken aroma of herbal organic chicken. However, for texture and flavour characteristics such as tenderness, juiciness, springiness, fibrousness, and sweetness; consumers preferred village chicken (semi-intensive). Consumers also preferred slightly tender, slightly juicy, moderately springy, slightly not fibrous, and slightly strong sweetness of village chicken (semi-intensive). Unfortunately, consumers showed the least preference on the characteristics of commercial broiler chicken meat. The results from chi-square analysis indicated gender and income as significant to consumers' preferences based on sensory characteristics when deciding on buying chicken meat. It was revealed that demographic variables such as region, age, race, religion, marital status, education level, occupation, and number of household were not significant.

Based on mean ranking analysis, most of the consumers preferred chicken with less fat and liked tender chicken meat because it was delicious. The consumers also believed that chicken feed influenced taste and odour of chicken meat. Nevertheless, consumers claimed that they dislike chicken meat with thicker skin. Meanwhile, the results of factor analysis revealed that nine factors such as colour, size, springiness, chicken aroma, fatty/oily taste, sweetness, visibility of fat, tenderness, and fibrous influenced consumers' perception towards chicken meat quality based on sensory characteristics. Finally, the findings of logistic regression proved that gender, income, colour, springiness, sweetness, visibility of fat, and tenderness represented the most important factors influencing consumers' preference towards chicken meat quality when deciding to purchase. Nevertheless, variables of age, education level, occupation, size, chicken aroma, fatty/oily taste, and fibrous were not significant in the model.

As a conclusion, the results obtained from the analyses have provided evidence that different types of chicken meat showed different sensory characteristics. Consumers preferred the sensory attributes of village chicken [semi-intensive] compared to commercial broiler chicken. Different socio-demographic profiles of consumers also influenced the buying decision of chicken meat. Gender and income are found to be significant on buying decision. Tenderness attribute is the major attribute that influenced consumers' preference towards chicken meat quality. This study provides a valuable guidance to producers, industry players, marketers, and policy makers to fully understand consumers' preferences by providing the intrinsic quality cues of the chicken meat especially on sensory characteristics.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Master Sains

PERSEPSI TERHADAP KEUTAMAAN PENGGUNA DAN CIRI-CIRI DERIA BAGI DAGING AYAM DI MALAYSIA

Oleh

SITI NASIHAH BINTI IMRAN

Jun 2015

Pengerusi : Profesor Madya Nitty Hirawaty Kamarulzaman, PhD
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Daging memainkan peranan yang penting dalam diet yang seimbang sebagai asas kepada sumber protein. Oleh kerana permintaan untuk daging ayam adalah tinggi di kalangan pengguna, kebanyakan pengeluar cuba untuk memenuhi permintaan ini dengan menghasilkan ayam yang cepat membesar dengan cara meningkatkan kecekapan pengeluaran mereka melalui peningkatan genetik, pengurusan, persekitaran perumahan, pemakanan, dan kesihatan haiwan. Peningkatan kesedaran pengguna mengenai isu-isu kesihatan telah menyebabkan mereka menjadi sangat sensitif kepada pengambilan makanan. Corak pengambilan daging mempunyai kesan yang besar ke atas perubahan dalam permintaan pengguna bagi daging. Peningkatan kadar penyertaan tenaga buruh wanita, peningkatan pendapatan per kapita, kadar peningkatan kawasan bandar, dan juga perubahan gaya hidup bandar diramalkan akan meningkatkan permintaan ke atas daging yang berkualiti di negara ini. Bagi kebanyakan pengguna, ciri-ciri deria seperti rupa, tekstur, bau, dan rasa merupakan kriteria keutamaan awal apabila membeli daging ayam. Kini, pengguna mempunyai pelbagai pilihan daging ayam di pasaran. Keutamaan pembelian pengguna adalah berdasarkan kualiti daging ayam yang terbaik di pasaran berdasarkan ciri-ciri deria pengguna. Oleh itu, objektif kajian ini adalah untuk mengenal pasti keutamaan pengguna terhadap pelbagai jenis daging ayam berdasarkan ciri-ciri deria.

Penilaian deria digunakan di dalam kajian ini bagi menganalisis ciri-ciri empat jenis daging ayam iaitu ayam pedaging, ayam kampung komersial [intensif], ayam kampung [separa-intensif] and ayam herba organik. Temuramah secara bersemuka dilakukan di pusat lokasi setempat bersama dengan 569 panel pengguna. Kaedah persampelan secara berstrata telah digunakan untuk memilih responden yang disasarkan. Skala yang telah digunakan bagi menguji penerimaan dan keutamaan pengguna pada daging ayam adalah berdasarkan pada skala 9-titik hedonik iaitu diantara 1 (sangat tidak suka) hingga 9 (sangat suka), manakala skala bagi menguji persepsi pengguna terhadap daging ayam adalah berdasarkan 5 skala Likert iaitu diantara 1 (sangat tidak setuju) hingga 5 (sangat setuju). Data kemudian dianalisis dengan menggunakan analisis deskriptif, analisis varians (satu-hala ANOVA), analisis khi-kuasa, analisis kedudukan min, analisis faktor, dan analisis regresi logistik.

Berdasarkan keputusan analisis deskriptif, majoriti responden adalah perempuan, berkahwin, berumur antara 18 tahun hingga 30 tahun. Kebanyakan daripada responden adalah Melayu, Islam, dan berasal dari kawasan Zon Tengah. Kebanyakan mereka mempunyai kurang daripada enam bilangan isi rumah, pemegang ijazah, mempunyai pengalaman bekerja di sektor swasta, dan memperoleh pendapatan bulanan antara RM1,001 hingga RM3,000. Secara umum, kebanyakan pengguna mengambil ayam sekurang-kurangnya dua hingga tiga kali seminggu dan daging ayam yang paling disukai adalah daging dari ayam pedaging komersial.

Hasil kajian berdasarkan analisis varians (satu-hala ANOVA) menunjukkan bahawa kebanyakan pengguna lebih suka kepada warna yang sederhana terang dan aroma ayam yang sedikit lemah bagi daging ayam herba organik. Walau bagaimanapun, untuk ciri-ciri tekstur dan rasa seperti kelembutan, intensiti jus/kelembapan, kekenyalan, berserat, dan kemanisan; pengguna lebih menyukai kepada daging ayam kampung (semi-intensif). Pengguna suka kepada ciri-ciri daging ayam kampung (semi-intensif) tersebut kerana dagingnya sedikit lembut, sedikit berjus/lembap, sederhana kenyal, tidak berserat, dan mempunyai kemanisan rasa daging ayam. Akan tetapi, hasil kajian menunjukkan bahawa pengguna kurang meminati ciri-ciri yang terdapat pada daging ayam pedaging disebabkan ciri-cirinya kurang memenuhi kehendak sensori pengguna. Hasil daripada analisis khi-kuasa menunjukkan bahawa jantina dan pendapatan didapati signifikan bagi mempengaruhi pilihan pengguna apabila membuat keputusan untuk membeli daging ayam berdasarkan ciri-ciri deria mereka. Manakala faktor demografi seperti kawasan, umur, bangsa, agama, status perkahwinan, tahap pendidikan, pekerjaan, dan isi rumah didapati tidak signifikan bagi mempengaruhi pilihan pengguna apabila membuat keputusan untuk membeli daging ayam.

Berdasarkan analisis kedudukan min, kebanyakan pengguna lebih suka daging ayam yang kurang lemak dan daging yang lembut kerana ia adalah lazat. Pengguna juga percaya bahawa makanan ayam boleh mempengaruhi rasa dan bau daging ayam. Walau bagaimanapun, pengguna mendakwa mereka tidak suka daging ayam yang mempunyai kulit yang tebal. Sementara itu, keputusan analisis faktor menunjukkan bahawa terdapat sembilan faktor yang mempengaruhi persepsi pengguna terhadap kualiti daging ayam berdasarkan ciri-ciri deria merek antaranya ialah warna, saiz, kekenyalan, aroma ayam, rasa kelembakkan, rasa kemanisan, lemak pada daging, kelembutan, dan berserat. Akhir sekali, keputusan bagi analisis regresi logistik membuktikan bahawa jantina, pendapatan, warna, kekenyalan, kemanisan, lemak pada daging, dan kelembutan merupakan faktor yang paling penting dalam mempengaruhi pilihan pengguna terhadap kualiti daging ayam ketika membuat keputusan dalam pembelian daging ayam. Walau bagaimanapun, faktor seperti umur, tahap pendidikan, pekerjaan, saiz, aroma ayam, rasa kelembakkan, dan berserat dilihat tidak signifikan kepada model.

Kesimpulannya, keputusan yang diperolehi daripada analisis telah menunjukkan bukti bahawa pelbagai jenis daging ayam menunjukkan ciri-ciri deria yang berbeza. Pengguna lebih suka sifat-sifat deria ayam kampung [semi-intensif] berbanding dengan ayam daging komersial. Latarbelakang sosio-demografi pengguna juga mempengaruhi keputusan pembelian daging ayam. Faktor jantina dan pendapatan didapati memberi kesan ke atas keputusan membeli. Sifat kelembutan adalah sifat-sifat utama yang mempengaruhi pilihan pengguna terhadap kualiti daging ayam. Hasil kajian ini dapat memberikan panduan yang berguna kepada pengeluar, industri, pemasar, dan pembuat

polisi dalam memahami sepenuhnya pilihan pengguna dengan menyediakan kualiti intrinsik bagi daging ayam.



ACKNOWLEDGEMENTS

First and foremost, I would like to express a sincere gratitude to my supervisor Associate Professor Dr. Nitty Hirawaty Kamarulzaman for the continuous support of my master study and research, for patience, motivation, enthusiasm, and immense knowledge. Her guidance helped me throughout the conduct of the research and the writing of this thesis. I would not have been completed or written my thesis without her support. Besides my supervisor, I would like to thank the other committee members, Dr. Nolila Mohd Nawi and Dr. Ismail Abd. Latif for their encouragement and insightful comments. I also would like to thank Prof. Dr. Zainal Abidin Mohamed for his kind, help, moral support, and suggestions in writing this thesis and without his help, the task would have been difficult.

I would like to express my profoundest gratitude to my lovely parents, Imran bin Hashim and Yong Sabariah binti Abdul Manan for their encouragement, understanding, loving and support to complete my study. A special thank also goes to my husband, Ahmad Syafiq bin Hamzah, who always supports my study. His patience, understanding, flexibility, and never ending encouragement made this study successful. My acknowledgement also goes to all my friends, Siti Fatimah, Gowri, Melissa, Lyana Farhan, Nur Aziera, Hazwani, Zura, Amalina, Zuliana, Zakiah, Hawa, Rafidah, and others to whom I am greatly indebted to. Last but not least, thanks to ALL that have provided me with such support and guidance. Thank you for everything!!!

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

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LIST OF ABBREVIATIONS

DVS	Department of Veterinary Services
EPPs	Four Entry-Point Projects
ETP	The Economics Transformation Program
FAMA	Federal Agriculture Marketing Authority
FAO	Food and Agriculture Organization
FELCRA	Federal Land Consolidation and Rehabilitation Authority
FELDA	Federal Land Development Authority
FLFAM	Federation of Livestock Farmers' Associations of Malaysia
GDP	Gross Domestic Product
MARDI	Malaysian Agriculture Research and Development Institute
MDTCC	Ministry of Domestic Trade, Cooperatives and Consumerism
MIDA	Malaysian Investment Development Authority
MOA	Ministry of Agriculture and Agro-Based Industries
NAP	National Agriculture Policy
NEP	National Key Economic Area
PKC	Palm Kernel Cake
SSR	Self-Sufficiency Ratio

CHAPTER 1

INTRODUCTION

The first chapter of the thesis consists of sections on introduction, problem statement, research questions, research objectives, significance of the study, and organization of the thesis. In the introduction section, discussion on the poultry industry is presented, followed by the problem statement. The research questions, research objectives and significance of the study are described in the following sections. The last section describes the organization of the thesis.

1.1 Poultry Industry in Malaysia

The poultry industry is the most advanced of livestock sub-sectors, with its commercialized, innovative, and integrated production system. This industry is always in a state of continuous transformation, through adoption of the most modern production technology and feeding systems (Federation of Livestock Farmers' Associations of Malaysia, 2014). The industry is well supported by commercial feed mills supplying compound feeds based on imported corn and soybean meal, which is increasingly handled in bulk form. The poultry industry includes production of chicken meat, table egg, duck, and quail. This is one industry for which product prices are regulated by the Ministry of Domestic Trade, Cooperatives and Consumerism (MDTCC) pursuant to the Price Controlled Goods Order, a subsidiary legislation under the Price Control Act, 1946.

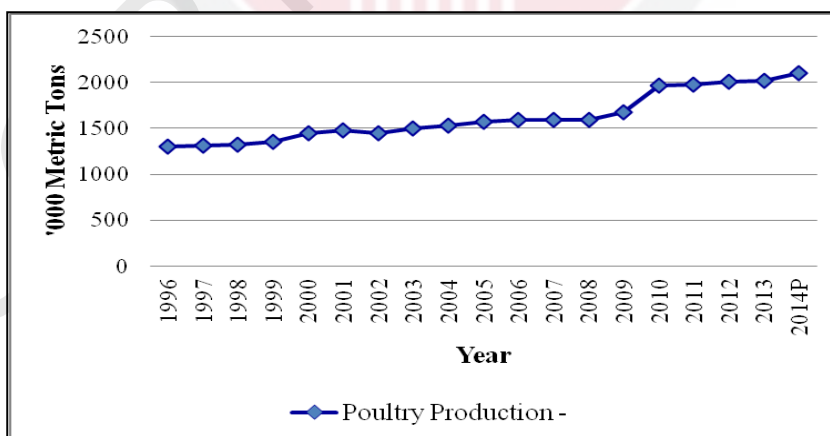
The rapid population growth over the last decade has led to an upsurge in the demand-driven consumption of meat products in the country. As a consequence of this, the poultry industry has witnessed an increased growth with positive contribution to agriculture and food production in Malaysia. The poultry industry is the largest economic contributor to the livestock industry, accounting for approximately 72.7% of the industry in 2012, as compared to 6.7% in 2008. However, the percentage increase in the poultry industry is slow (0.2%-0.4%) when compared to cattle and other livestock. The contribution of the poultry industry to GDP for the period 2008-2012 is given in Table 1.1. As seen from Table 1.1 the contributions of the poultry industry to the national GDP has been increasing steadily from 2008-2012, unlike the other livestock industries wherein the growth is minimal.

Table 1.1: Percentage Share of Poultry industry to Malaysian GDP for 2008-2012

Kind of economic activity	2008	2009	2010	2011	2012
Rubber	10.4	8.3	8.8	8.8	8.2
Oil palm	37.4	37.3	35.3	37.0	36.5
Livestock	9.0	13.7	14.6	15.0	16.10
▪ Poultry	5.2	9.7	10.4	10.8	11.7
▪ Cattle	1.2	1.3	1.4	1.4	1.4
▪ Others livestock	2.6	2.7	2.8	2.8	3.0
Other agriculture	14.7	16.1	17.0	17.2	18.2
▪ Paddy	2.1	2.2	2.2	2.2	2.2
▪ Vegetables	5.5	6.1	7.0	7.2	8.0
▪ Fruits	3.3	3.6	3.8	3.8	4.1
▪ Food crops	3.0	3.2	3.2	3.1	3.1
▪ Others	0.8	1.0	0.9	0.8	0.8
Forestry and logging	15.0	14.3	13.5	11.9	11.0

Source: Department of Statistics Malaysia (2013)

Figure 1.1 represents the production trend of poultry from 1996 to 2014. As can be seen in Figure 1.1, the production path of poultry increased steadily from 1996 to 2001. In 2002, the production of poultry dropped by about 29,000 tonnes. However, it recovered soon, and in 2003 the production increased at a moderate rate. The drastic and steady growth in production from 2008, as observed in Figure 1.1 is due to government initiatives under the Third National Agricultural Policy (NAP3) and National Agro-Food Policy (NAP). Broiler meat is the largest contributor to this increased production in poultry meat. The period of 2012-2014 showed the broiler production to be on an increasing trend by 4,5% at 1.44 million tonnes (FAO Statistics Division, 2014).



Note: ^P: preliminary

Source: Department of Statistics Malaysia (2014)

Figure 1.1: Poultry Production ('000 tonnes) from 1996 -2014^P

The self-sufficiency ratio (SSR) indicates the domestic production that can meet its utilization by the domestic population. It indicates whether the domestic production is more than sufficient to support the country's supply. When self-sufficiency ratio (SSR) is less than 100 percent, it indicates insufficiency of production to deal with the demands for domestic requirements. Meanwhile, if the ratio is more than 100 percent, it indicates that the domestic production is more than sufficient to support domestic demand.

Based on the self-sufficiency ratio (SSR) for selected livestock products (Table 1.2), Malaysia has achieved self-sufficiency in poultry meat production as compared to other livestock products such as pork, mutton, and beef. Table 1.2 reveals that only poultry production has reached more than 100 percent self-sufficiency ratio (SSR) over the period of 2007-2011. On an average, the SSR for poultry production increased by about 0.7% during 2007-2011. However, the SSR of poultry products showed a drop of 7.8% in 2010, which recovered to increase by 0.8% in 2011. The SSR of poultry products dominated with the highest SSR, followed by pork, beef, and mutton.

Table 1.2: Self-Sufficiency Ratio of Livestock Products in Percentage (%) During 2007-2011

Livestock production	2007	2008	2009	2010	2011
Poultry	114.5	119.3	122.2	114.4	115.2
Pork	99.2	99.3	99.3	96.1	95.7
Mutton	9.1	9.8	10.5	9.8	13.2
Beef	24.5	28.3	28.4	30.6	29.8

Source: Department of Statistics Malaysia (2012)

1.1.1 Scenario of Chicken Production in Malaysia

The chicken industry is an important sub-sector due to its role as a lower price-high protein and quality meat source for the population; supplying chicken meat to the food processing industry. In terms of production, the chicken industry is the largest economic contributor to the livestock industry, accounting for approximately 83% of the industry in 2011 and increased to 95% in 2012. The poultry industry, in particular the chicken industry had shown a steady development over the last few decades (1970-2014), fuelled by active participation of the private sector.

The chicken meat production has shown growth at a moderate rate of 4% from 2012-2014 (Table 1.3) with production forecast at 1.44 million tonnes in coming years. In order to fulfil the domestic demands for chicken meat in 2014, 54,000 tonnes chicken meat will be imported as compared to the 32,000 tonnes exported from the country. Almost 90% of chicken production occurs in Peninsular Malaysia, and Sabah and Sarawak account for the remaining 10%. In terms of bird numbers, 67% comprise of

broilers, 25% of layers, and 8% of breeders (DVS, 2014). The statistics accounts for contract farmers, independent farmers as well as integrated farms.

Table 1.3: Chicken Production (Tonnes) During 2012- 2014^P

	2012	2013	2014 ^P
Production	1,374,500	1,408,862	1,437,039
Imports	52,595	53,600	54,000
Total Supply	1,427,095	1,462,462	1,491,039
Domestic Consumption	1,394,598	1,431,062	1,459,039
Exports	32,497	31,400	32,000
Total Distribution	1,427,095	1,462,462	1,491,039

Note: ^P: preliminary

Source: Department of Veterinary Services (2014)

The chicken industry has huge potential for further growth and expansion; however rising consumption and costs of production are limiting the scope of expansion. The depreciation of Malaysian ringgit (RM), reduction in fuel subsidies, and restrictions on minimum employment wages are factors that led to the higher production costs in 2014. The growing need for feed and breed inputs also contributed to increasing costs of production. Almost all these inputs are imported from other countries. Imported corn and soybean accounted for 65% of the production costs. The average cost of production has increased from \$1.45 per kg in 2012 to \$1.60 per kg in 2013, and the forecast for 2014 is an increase to \$1.68 per kg (Federation of Livestock Farmers' Associations of Malaysia, 2014).

In any livestock industry, feed cost accounts for a large proportion of the production costs. Raw ingredients for feeds such as corn and soybean are not produced in Malaysia. Most of the intensive chicken farming is dependent on imported feedstuffs. The others feedstuff ingredients like fishmeal, bone meal, mineral sources like vitamins, and other additives to improve the feed efficiency and growth are also imported from outside sources (Loh, 2002). The chicken industry uses about four million tonnes of compound substance feed annually and this is expected to increase in coming years. The industry receives supplies especially from the United States and Argentina for corn feed, soybean feed and breeder chicks. The chicken industry purchased about 66 thousand tonnes of corn feed in 2013 and imports about 1 million breeder chicks annually, valued at more than RM6.54 million (USDA, 2014).

The local feed produced in Malaysia is still in low supply. The uses of local feed produced ingredients depend on its supply, cost, and quality. Examples of locally produced ingredients are tapioca and fishmeal. However, the amount produced is still not sufficient to meet the requirements of domestic feed industry. Other local feedstuffs such as rice bran, kernel cake, cassava, and sago have been identified as alternative formulation of feeds and substitutes to imported feeds like corn and soybean. However, the developmental process for new formulations is lagging behind. It is thereby suggested that through development of alternatives to imported feedstuffs formulations, or by fully utilizing the agricultural wastes, the problems of feedstuff shortage and dependence on imports could be solved (Loh, 2002).

The high cost of feed and feedstuffs has caused a rise in the cost of production. Most of the feed and feedstuffs are imported from other countries. The availability of low-priced and high-quality feed is critical. Due to the increasing costs of feed, the chicken industry is facing some challenges. Therefore, there is a growing research to develop alternative feed formulations to substitute for the imported feeds such as corn and soybean. Utilizing local resources and agricultural wastes will thereby reduce the dependency on imports. However, the replacement of import feed and feedstuffs with a low-cost alternative requires assessment of not only poultry performance and carcass characteristics, but also meat quality. The optimizing of production systems from small-scale or medium-scale towards the large-scale production systems as well as difference in chicken feeding could provide different qualities of chicken meat (Castellini et al., 2002; Fanatico et al., 2005; Nantachai et al., 2007).

Liberalization and globalization have resulted in increased opportunities and new markets for local chicken meat export. Malaysia has the ability to be competitive in the global chicken industry through more efficient and productive production practices focused on exploring global export markets. Malaysia was ranked 14th among top global chicken meat producers, with a production of 1.32 million in 2011. Malaysia exports some processed chicken meat products to neighbouring countries such as Thailand, Singapore, Brunei, Indonesia, and Vietnam, as well as to Middle East countries like Saudi Arabia, United Arab Emirates, Kuwait, Qatar, and Oman. To Singapore, Malaysia exports over 50 million live broilers annually. In order to balance trade and remain competitive, it is imperative to control the import of chicken meat, while exploiting global export markets.

Chicken meat imports are strictly controlled by the government and have a limitation in numbers. China is the leading supplier of chicken meat to the country, followed by Thailand, Denmark, Netherlands, and the United States. All imported chicken meat must be inspected and approved by the Malaysian Department of Veterinary Services (DVS) and *halal* certifying body such as the Department of Islamic Development Malaysia (JAKIM). The Malaysian government strictly follows the procedures in *halal* slaughtering and handling for imported produce. Malaysian *halal* protocol for meat production was developed by JAKIM in order to provide explicit control in the *halal* meat production. This protocol was developed to support the Malaysia's *halal* meat requirements. This protocol is valid to all establishments producing *halal* meat and products in Malaysia including those countries who are aiming to export to Malaysia (Wahab, 2014). This protocol explains the practical guidelines regarding the slaughtering, stunning method, dressing process, storage, and transportation to follow *halal* requirements.

Chicken production in Asia follows two trends (Steinfeld, 1998) which are traditional and modern production systems. The traditional production system is a resource-driven and labour-intensive process, which creates a multitude of services to subsistence farms. Low technology uptake, insufficient market facilities and infrastructure, and small economies of scale are common features of this system. Meanwhile, the modern production system is a demand-driven and capital-intensive process. The production is mainly industrialized, which is very efficient and have good access. However, increasing intensification of chicken will only increase pollution and disease risks to humans (Steinfeld, 1998).

1.2 Chicken Consumption Pattern in Malaysia

Malaysian population does not just prefer to eat chicken meat, but chicken meat is also one of the cheapest protein sources available in the country. Chicken meat is the staple protein sources for all ethnic and religion groups in Malaysia because of no religious restrictions against chicken consumption. Chicken meat is also the prime meat offered in all food restaurants and food service outlets. Chicken is much cheaper than beef, mutton, and pork. The price is relatively between RM5 to RM8 per kg (Table 1.10). The price is generally consistent, but tends to increase during festival seasons.

Table 1.10: Average Retail Price of Selected Livestock Meats

Types of Meat	Average Retail Price (RM/kg)
Processed Chicken Meat (Standard)	5 – 8
Mutton	30 – 40
Beef	15 – 30
Pork	16 – 20

Note: Data obtained on 7th July 2014

Source: Department of Veterinary Services (2014);
Ministry of Domestic Trade, Co- Operatives and Consumerisms (2014);
Federal Agricultural Marketing Authority (2014)

As per capita income increases, the demand of chicken meat also increases. In Southeast Asia, Malaysians are among the top poultry consumers, with an average annual consumption of 38 kg chicken meat per person (Business and Market, 2013). Poultry consumption increased by 24% in 2013. Due to the changes in Malaysian lifestyles and the availability of instant ready-to-cook chicken products such as chicken nugget, chicken fried, chicken sausage, and others, there is no limit for the demand of chicken meat (Hoe, 2011). Consumption for chicken meat is forecasted to increase from 1.4 million tonnes in 2013 to 1.43 million tonnes in 2014.

Chicken meat is a staple food in the diet for most households in Malaysia, and consumed at least once a week either at home or in restaurants (World Poultry, 2014). Chicken meat is also an important component for fast food restaurants such as KFC, Burger King, McDonalds, A&W, and Kenny Rogers with their growing number of outlets in Malaysia. Poultry production in the country is more than sufficient to meet domestic demand, so excess supply is exported to other countries like Singapore and Middle Eastern countries.

Chicken meat consumption is viewed as a reflection of the economic conditions. The increasing rate of female labour force participation, rapid economic growth over the past decades, as well as the rising rate of urbanization, appears to have a significant impact on the observed meat consumption pattern. On the other hand, changes in proportion of the different racial populations (i.e. Malay, Chinese and Indian) and changes in proportion of the aging population have no effect on the demand pattern for chicken meats.

Chicken meats are an important component of the Malaysian diet. About 25% of total protein intake of Malaysians is estimated to be from meats (Maria, 2006). With rapid population growth and improved per capita income, as well as lifestyle changes due to urbanization, the demand for meat products is predicted to further increase in the country. Demand for meat products is important for policy makers because it can influence changing food prices, self-sufficiency and the nation's trade balance (Shamsudin et al., 2004).

Today, Malaysian consumers demand for safe and high quality of food at reasonable price. They are very sensitive towards issues regarding food safety and *halal*. It is important to note that majority of the Muslim consumers do not accept meat products that are not certified *halal* by the JAKIM. Malaysian consumers are also price-sensitive and look for products that give value for their money. Thus, it adds to the growing challenges for the livestock industry especially the chicken meat industry in order to produce new and innovative products at lower costs without compromising on the quality.

Consumers are now also increasingly concerned about certain food safety issues like hormones, and antibiotics used in animal feeds, and the quality of their daily food (Verbeke, 2002). Quality is often perceived in terms of eating quality. Quality has become a key word for producers and consumers. Consumers on the other hand, interested in many aspects such as taste, freshness, appearance, nutritional value, origin, and food safety (Grunert et al., 2004; Jongen et al., 1999). The increasing incomes of consumers are leading to increased demand for healthy meat. Consumers' meat consumption behaviour suggests that convenience, health, and quality are more important, when compared to the price indicator (Bansback, 1995; Becker et al., 2000).

1.3 Problem Statement

Meat plays an important role in a balanced diet as a source of protein intake. A high consumption of red meat will cause health problems such as cardiovascular disease, and cancer. The consumers demand has therein shifted towards white meat. The low price of chicken meat makes it the best alternative for red meat. Since the demand for chicken meat is high among consumers, many producers try to meet this demand by producing fast-growing chicken with less diseases and weighing an average 1.5kg to 2.5kg to ensure maximum profit. Therefore, many large-scale modern production systems optimize their production efficiency through enhancing genetics, management, housing environment, nutrition and animal health. The use of antibiotics in animal feed can prevent diseases in chicken, and at the same time improve productivity and profit for the producers.

Apart from that, the growing consumer awareness towards health issues has resulted in sensitivity towards food consumption and increased in demand for quality foods. Now, there is a greater demand by consumers for foods perceived as "natural", "fresh tasting", "healthy", and "more nutritious". Most of the consumers believe organic foods to be healthier than the conventional foods, as the previous is produced in a more environmentally compatible manner without any usage of chemical residue, and have better sensory quality.

Meat consumption pattern has a significant effect on the changes in consumer demand for meat. The increasing rate of female labour force participation, improved per capita income, rising rate of urbanization, as well as lifestyle changes resulting in urbanization are predicted to further increase the demand for quality meat in the country. The differences in socio-demographic profiles are also predicted to have different attitudes while deciding on buying chicken meat.

Some consumers prefer village chicken meat as compared to broiler chicken meat due to the quality of sensory characteristics. Now, consumers have greater choices for different types of chicken meat in the market. Consumers' preferences depend to the best quality of chicken meat based on sensory characteristics. There are several factors that affect the quality of chicken meat including feed additives and management processing.

Consumers tend to pay more for additional quality attributes. Many consumers believe that the high quality of chicken meat must fulfil their sensory aspect perceptions. Consumer acceptance and preference for chicken meat depend on how much the consumers perceive their eating quality. For consumers, appearance, texture, odour, and flavour are the initial factors influencing consumers' preference criteria while purchasing chicken meat. In addition, freshness of the chicken meat as an indicator of meat quality also plays an important role in determining consumers' selection of chicken meat. An understanding of the factors influencing chicken meat quality is critical in producing uniform quality products.

The different types of chicken meat affect meat quality on the texture, odour, appearance, and flavour. The understanding on consumers' need for quality chicken meat will help the industry to maintaining and increasing their market shares. In the end, the industry will be able to produce chicken meat that meets consumers' preferences. Based on the previous discussions, many problems might be faced by the Malaysian chicken industry players if the consumers demand for quality chicken meat is not met, and this will definitely lead to a wider gap between consumers demand and producers supply.

1.4 Research Questions

Four specific research questions are being addressed through this study. The research questions are as follows:-

1. Are there any differences in sensory quality characteristics among different types of chicken meat?
2. Are there any differences on consumers' acceptance and preference among different types of chicken meat?
3. Is there any relationship between consumer's preferences on sensory characteristics while deciding on buying chicken meat and consumers' demographic profiles?
4. What are the most important factors that influence consumers' preferences towards chicken meat quality?

1.5 Objectives of the Study

The general objective of this study was to determine consumers' preference towards different types of chicken meat based on sensory characteristics.

The specific objectives of this study are as follows:-

1. To determine sensory characteristics for different types of chicken meat.
2. To determine consumers' acceptance and preference for different types of chicken meat.
3. To determine the relationship between consumers' preferences on sensory characteristics while buying chicken meat and socio-demographic profiles.
4. To determine the most influential factors that influence consumers' preferences towards chicken meat quality.

1.6 Significance of the Study

The aim of this study was to gain knowledge about sensory characteristics and preference for different types of chicken meat in Malaysia that could help producers to produce quality chicken meat in order to increase their competitive advantage. By considering sensory characteristics and consumers' preferences for different types of chicken meat in Malaysia, sufficient information could be provided to producers to determine the underlying factors that affect the meat sensory characteristics in order to maximize consumers' acceptability. Besides, the study also allows chicken industry players to effectively identify and understand consumers' acceptance and preferences. For marketing purposes, it helps marketers to know the factors that influence consumers' perception towards chicken meat quality, and factors perceived as most important. Thus, it is hoped that this study will fill the gap on consumers demand for good quality chicken meat, and motivate producers to engage in supplying good quality chicken meat. The study will provide some benefits to chicken producers, food processors, and food marketers by identifying demand and market potentials for chicken meat in Malaysia.

1.7 Organization of the Thesis

This thesis is divided into five chapters. Chapter 1 briefly discusses the background of the study, problems faced in the industry, research questions and objectives of the study. Chapter 2 summarizes previous literatures and findings related to the sensory evaluations, sensory characteristics, and perception on meat quality. Chapter 3 explains the conceptual framework, methodology and analysis methods used for this study. Chapter 4 discusses findings of the study, and last Chapter 5 summarizes the findings of the study, conclusions, recommendation, limitations of the study, and suggestions for future research.

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