

Consumer's preference towards fresh coconut and coconut based food products in Malaysia

(Kecenderungan pengguna terhadap kelapa segar dan produk makanan berasaskan kelapa di Malaysia)

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Abstract

Intention to purchase a product can be determined by the behavioural dimensions related to the knowledge, behaviour and socioeconomic background of consumers. Researchers, producers, marketers and policy makers must be more sensitive to the needs of Malaysian consumers and increase their confidence on purchasing coconut based food products. This article aims to examine consumers' willingness to purchase coconut products. Furthermore, this article focuses on determining their preference for coconut based products such as coconut water, coconut milk and others. A total of 649 consumers were evaluated using a structured questionnaire survey. They were asked to indicate their preference for the characteristics of coconut, the reason for choosing coconut products and the frequency of purchasing coconut products. Consumers were also asked to explain their knowledge about the coconut variety. Descriptive analysis was used to measure the highest percentage of trend composition, which was then tested using the t-test and chi-square test. Furthermore, Exploratory Factor Analysis (EFA) was used to determine the underlying dimension of coconut consumption factors. The most preferred products were coconut water, followed by coconut milk, coconut jelly and *kerisik*. It was found that 60% of consumers could not distinguish coconuts based on variety. EFA showed that the factors that influence consumers when consuming coconut products are influence, financial value and health.

Introduction

Coconut is the fourth most important agricultural commodity in Malaysia after oil palm, rubber and rice. This crop contributed as much as RM72.7 million or 0.06% to Malaysia's agricultural export revenue in 2020 (DOA 2021). Coconut products are not only focused on fresh products but many downstream products can be produced from coconuts such as desiccated coconut, coconut milk powder, shell charcoal,

activated carbon, fresh coconut products, tender coconut, coconut oil, fibre and coconut coir.

Even though coconuts are widely used in daily activities, the coconut plant is still threatened when many areas of coconut plantations are replaced by oil palm, rubber and vegetable crops that have many advantages in terms of productivity and rapid income. In addition, coconut plantations are also threatened by the

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modernisation of the development of high-value economic areas. Although there is a reduction in the area of coconut plantations from 83,436 ha (2018) to 81,898 ha (2022), coconut production has increased from 491,465 mt (2018) to 561,780 mt (2022). The production value also increased from RM501,295 in 2018 to RM601,104 in 2022 (DOA 2022). The increase in production productivity is due to the effect of the use of technology in coconut production such as the use of hybrid and inbred varieties that are highly successful and the technology of effective agronomic practices.

The production of coconut processing technology also shows a positive development with the production of food products, beverages, and coconut-based health products. In 2011, the demand for coconuts reached 639,768 mt and now increased to 856,519 mt in 2022. To meet another 29.9% of coconut demand, the country had to import 252,091 mt of coconuts from Indonesia. By 2022, coconut cultivation is dominated by smallholders which are 94% (76,597 ha) and the rest is estate plantation and government departments 6% (5,301 ha) (DOA 2022).

Research background

Based on the increasing coconut production and demand year by year, the coconut industry has great potential and is related to the cornerstone of Malaysian culture and cuisine, playing a multifaceted role in daily life. In the realm of food, coconuts are indispensable, lending their creamy richness to countless traditional dishes like *laksa* and *nasi lemak* through coconut milk. They also star in the realm of desserts, with *kuih seri muka* and *onde-onde* being just a couple of examples of sweet treats that incorporate coconut. Additionally, coconut-based snacks like *kerisik* and the beloved *kaya jam* offer delightful flavours and textures. Coconut water, derived from young green coconuts, quenches the Malaysian thirst, providing hydration and refreshment in the country's tropical climate. Beyond the culinary sphere,

coconuts hold cultural and spiritual significance in Malaysian society. They are often used in religious rituals and ceremonies, symbolising purity, and blessings. The coconut tree represents Malaysia's beautiful tropical image, decorating its stunning beaches and shores, and adding to the appeal of Malaysia as a tourist hotspot. Moreover, coconuts have an economic impact, sustaining livelihoods in the coconut industry and providing income for vendors who sell coconut water to tourists. Altogether, coconuts are deeply woven into the fabric of Malaysian life, both as a source of sustenance and as a cultural emblem that enriches the nation's identity. The cultural and economic relationship between coconut and community society in Malaysia is the reason for us to understand the extent of the consumer's inclination towards fresh coconuts and coconut-based products. Understanding consumer preferences towards coconuts is of utmost importance to various stakeholders including farmers, producers, marketers, and policymakers. Consumer preferences influence the entire coconut value chain, from cultivation practices to product development and marketing strategies. This understanding can lead to more sustainable and profitable coconut businesses and more informed policy decisions. The study aims to determine consumer preferences towards fresh coconuts and coconut-based food products.

Literature review

Knowledge of consumer preferences helps coconut farmers make informed decisions about which coconut varieties to cultivate and how to manage their farms. For example, if consumers prefer coconuts for their water content, farmers may prioritise cultivating varieties with higher water yields. This can lead to improved crop yields and farm incomes (Khalikov et al. 2019).

For coconut-based product manufacturers, understanding consumer preferences can guide product development efforts. For instance, consumers might favour coconut products that are sustainably sourced or have specific health benefits. By catering to these preferences, producers can create market-leading products. A report by Mintel, a global market research firm, titled “The Rise of Coconut in Food and Drink” (2017), highlights the growing consumer demand for coconut-based products and the need for innovation in response to these preferences.

Marketers can use knowledge of consumer preferences to tailor their advertising and branding strategies. If consumers are interested in the origin of coconuts or ethical and sustainable practices, marketing campaigns can emphasise these aspects. The Harvard Business Review article “The New Science of Customer Emotions” authorised by Scott et al. (2015) discusses how understanding consumer emotions and preferences can drive marketing success.

Policymakers can benefit from consumer preference data when making decisions about trade regulations, quality standards, and agricultural policies related to coconuts. For example, if there is a strong preference for organic coconut products, governments may consider incentivising organic farming practices in the coconut industry. Variyam, Jordan & Epperson (1990) have examined the role of consumer preferences in shaping agricultural policies.

Understanding consumer preferences toward coconut is pivotal for optimising agricultural practices, guiding product development, enhancing marketing strategies and formulating informed policies. The cited sources underscore the importance of aligning various aspects of the coconut industry with consumer preferences to foster sustainability, innovation and economic growth.

Research methodology

In order to understand consumer preference towards coconut-based food products, primary data was obtained through a survey method conducted throughout the nation zone, namely Peninsular Malaysia, Sabah, and Sarawak. A total of six sampling zones were created to obtain respondents who were divided into the northern, southern, eastern, central, Sabah and Sarawak zones. The selection of these user respondents was made by simple random sampling. A total of 649 users were interviewed to obtain data for this study. According to Sudman (1976) and Hair et. al (2008), the number of respondents that exceeded 600 or more was sufficient to obtain information by using simple random sampling. *Figure 1* shows the distribution of respondents for this study. In the analysis of primary data, several methods are used such the descriptive statistical methods to see the percentage of the respondent’s background and the respondent’s preference behaviour. This method is commonly used by researchers in producing a summary and preliminary results.

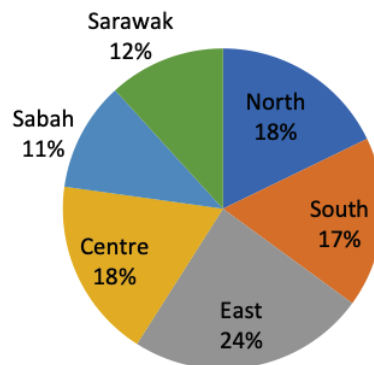


Figure 1. Percentage of consumer respondents' distribution by zone

In addition, factor analysis is also used to identify factors that influence the purchase and selection of coconut-based food products. This method categorizes variables based on factor loading and community. There are specific conditions to determine whether factor analysis can be carried out or not, namely by first carrying out Bartlett's and Kaiser-Mayer-Olkin (KMO) tests. If the value of KMO and Bartlett's exceeds 0.5, then the data of this study is suitable for factor analysis. In addition, the internal consistency level of the study instrument was measured first and the Cronbach's alpha value should exceed 0.7. Principal component analysis and VARIMAX techniques were used to identify the factors that influence the purchase of coconut products. The components are determined based on an eigenvalue of 1.0 while the load factor and community are set at least 0.50 to turn off the factor as significant (Irwan et al. 2007). This factor is measured using the standard multiplier ratio (a_{im}) as follows: $a_{im} \leq 0.5$ = not significance, $0.5 < a_{im} < 0.69$ = medium, $0.7 < a_{im} < 0.79$ = high, $a_{im} \geq 0.8$ = most significance (Abu Kassim et.al, 2008). Gorsuch (1983) recommended that the sample size (N) for factor analysis should be at least 100 while Kline (1979) supported this recommendation. Comrey and Lee (1992) offered a rough rating scale for adequate sample sizes in FA: 100 = Poor, 200 = Fair, 300 = Good, 500 = Very good, and 1,000 or more = Excellent. In this study, a total of 649 respondents were assumed sufficient to carry out this analysis. In addition, some other statistical techniques are also used such as chi-square value and *t*-test to test the relationship of the respondent's profile with the rate and purchase behaviour.

Results and discussion

Respondent profile

This study involved 649 consumers throughout Malaysia of which 77% were respondents from Peninsular Malaysia and the rest from Sabah and Sarawak. Almost

50% of the respondents had a secondary school education followed by tertiary and primary school education while the remaining 1.2% had never been having a proper education. Most respondents earn less than RM1,000 per month followed by the range of RM1,001 to RM2,000. The profile background of this respondent will be used to study its relationship with the purchasing behaviour of coconut products. The detailed information on the respondent profile for users is shown in *Table 1*.

Table 1. Respondent profile

Consumer profile	N = 649	%
Location		
North zone	116	17.8
South zone	111	17.2
East zone	156	24.0
Centre zone	118	18.2
Sabah zone	71	11.0
Sarawak zone	77	11.8
Gender		
Male	245	37.8
Female	404	62.2
Education level		
No formal education	8	1.2
Primary school	32	4.9
Secondary school	323	49.8
Tertiary education	286	44.1
Monthly income (RM)		
<1001	233	35.9
1001 – 2000	190	29.3
2001 – 3000	100	15.4
3001 – 4000	58	9.0
4001 – 5000	35	5.4
≥5000	33	5.1

Purchasing coconut based food products

A total of 12 coconut-based food products were listed for responding to purchase status by respondents. 4,701 responses can be generated from 649 respondents. It turned out that most respondents had bought fresh young coconut water followed by fresh

coconut milk and coconut shakes. Complete details of coconut-based food products’ “ever purchased” status as shown in *Table 2*.

Table 2. Coconut-based food products purchase status

Coconut products	N	Percentage (%)
Young coconut water	639	13.6
Fresh coconut milk	599	12.7
Coconut shake beverage	593	12.6
Coconut jelly	528	11.2
Grated coconut	485	10.3
UHT coconut milk (packed in tetra pack box)	427	9.1
Toasted coconut paste (<i>kerisik</i>)	371	7.9
RBD coconut oil	304	6.5
Nata de coco	281	6.0
Coconut powder cream	179	3.8
Virgin coconut oil	175	3.7
Coconut sagun	120	2.6
Total	4701	100.0

Awareness of coconut varieties

A total of 649 respondents, 68%, did not know the variety of coconuts after being shown coconuts. Survey findings on consumers who know the type of coconut variety and at the same time buying young coconut water show the majority (46%) prefer *Pandan* varieties followed by *Matag* (12.3%). *Table 3* shows the preference of young coconut across varieties.

In terms of the colour of young coconut, most consumers prefer to choose green (69%) followed by yellow (6.5%) and red (1%). The remaining 24% do not care much about the colour of the coconut. The chi-square test shows that there is a significant difference between the colour classes tested at the 0.05 level. The price range of young coconut water for each coconut is around RM3.50 to RM13.00 depending on the location of the purchase, either at the street side, restaurant or hotel.

Overall, the median price for young coconut water sold throughout Malaysia is RM4.00/coconut. The average frequency of purchasing young coconut water obtained through this study is three times a month with the quantity of two coconuts for each purchase. Considering the Malaysian population of 31.5 million, then 17% of them made a transaction to purchase young coconuts therefore the current expected consumption of young coconuts is 32.13 million coconuts/month. Many consumers may not realise that the coconut water that has been sold in boxes and cans at the market mostly are old coconut water. A total of 62% of the study respondents never drink coconut water that is readily packaged in boxes and cans. But for those who have consumed this product, 52% of them said that this product is delicious and will buy it again in the future.

Table 3. Preference of young coconut across varieties

Types of varieties	N	Percentage %
Pandan	122	45.5
Does not care about varieties	64	23.9
Matag	33	12.3
Mawa	20	7.5
Gading	20	7.5
Malayan Tall	6	2.2
Others	3	1.1
Total	268	100.0

Consumption and preference toward grated coconut and coconut milk

Average consumers say the price of grated coconut ranges from RM3 – RM9/kg, with an average of RM4.00/kg. The purchasing frequency is three times a month with an amount of one kilo of grated coconut/ purchase. Retail stores and wet markets are still the focus of consumers when it comes to purchasing grated coconut. Three types of coconut milk, namely fresh coconut milk, UHT coconut milk (pack/can) and

coconut milk powder, were used to compare consumer preferences. It was found that consumers were more likely to use fresh coconut milk (71%), followed by UHT coconut milk (26%) and coconut milk powder (3%). Fresh coconut milk is more reliable than preservatives in terms of its freshness, quality and safety. For users who use coconut milk in can/pax and coconut milk powder, the reason for using it is because it is easy to use, the coconut milk can be stored for a long period and is used as an alternative when the fresh coconut milk is not available. Besides coconut milk, there is also palm oil milk sold (from palm oil kernel) in the market. A total of 475 consumers responded and 13.7% of them have used palm oil milk in their food preparation. It turns out that coconut milk is more dominant in gaining the trust of consumers to be used in daily cooking activities.

Preference towards other coconut-based food products

There are two types of coconut oil in the market; the first is crude coconut oil (CCO) which is widely used as a cooking ingredient, especially in some village communities that still use coconut oil as cooking oil. It is also used for external uses such as a massage oil. The second is virgin coconut oil (VCO) which is widely used for health purposes such as to be consumed according to the prescribed dose, also used for personal care especially hair oil and to prevent skin dryness. The price of VCO is a bit expensive compared to CCO. There are several brands of VCO on the market including An-Nur, Bio Asli, It Works and others.

A survey to see the purchase rate of some other coconut-based food products such as coconut shake, *kerisik*, coconut jelly and sagun shows that there is no change in the level of purchase or the same purchase quantity compared to previous years. The average estimate for each user spending monthly on coconut shakes is RM9.80

followed by *kerisik* at RM6.70, coconut jelly at RM6.00 and sagun is RM3.30.

Marketing channel of coconut-based food products

Six marketing channels were listed in the questionnaire to determine the preferable channels for consumers buying coconut products. Generally, consumers buy coconut products from various stores according to their needs which are comfortable for themselves. This study indicates that hypermarkets and retail markets are the main choices of consumers. Specifically, young coconut water was mostly bought from roadside booths, fresh coconut milk from fresh and wet markets, grated coconut from the wet market and grocery store and *kerisik* from fresh markets while other products were mostly bought from hypermarkets. The details of information on the market channels are shown in *Table 4*.

Many previous studies have explained the relationship between consumer and marketing orientation in determining the pattern of buying food products and the direction of the food industry (Meulenberg and Viaene 1998). Thompson and Kidwell (1998) found that the convenience of a consumer to get food products or premise locations impacted consumers' decision to buy food products. In this study, 12 factors that are likely to affect the purchasing of coconut products are identified in *Table 5* as shown below.

All 12 factors were tested in the reliability analysis and the value of Cronbach's alpha = 0.791. According to Field, when the value of Cronbach's alpha exceeds the value of 0.7 then the data for this factor can proceed for factor analysis. When the factor analysis was executed, the value of KMO = 0.792 indicates this factor analysis can be accepted because the value of KMO exceeds 0.5 (Irwan et al. 2007).

Table 6 shows the varimax pattern for factors that influence purchasing. The three main factors have been extracted explaining the 58.8% variance in the study.

Table 4. Marketing channels of coconut products

Products	N	Road side	Fresh/wet	Hypermarket	Farmer	Night	Retail
		booth	market		market	market	market
		Percentage (%)					
Coconut water	1148	51.4	10.9	3.4	12.2	18.7	3.4
Fresh coconut milk	860	3.5	45.9	11.7	11.9	2.6	24.4
UHT coconut milk	656	1.2	9.9	56.4	4.0	1.5	27.0
Powder coconut milk	387	3.6	12.4	50.4	6.7	2.3	24.5
Coconut jelly	776	31.8	9.4	17.0	13.9	17.4	10.4
<i>Kerisik</i>	590	4.6	31.5	19.2	11.2	5.1	28.5
Grated coconut	605	5.6	37.5	8.9	10.6	3.0	34.4
Sagon	331	11.5	13.6	18.4	13.0	6.0	37.5
Coconut sugar	413	4.8	21.1	27.4	12.3	5.3	9.1
Nata de coco	524	3.1	6.1	67.7	3.6	2.1	17.4
Crude coconut oil	515	3.7	12.0	45.2	8.5	6.8	23.7
Virgin coconut oil	324	3.7	6.2	52.2	9.3	9.0	19.8
Total	7129	128.5	216.5	377.9	117.2	79.8	260.1

Table 5. Purchasing factors of coconut products

Code	Variables	Code	Variables
X ₁	Affordable	X ₇	Cheap
X ₂	Advertisement	X ₈	Easy to store
X ₃	Friends	X ₉	Local products
X ₄	Packaging	X ₁₀	Import products
X ₅	Nutrition contents	X ₁₁	Disease treatment
X ₆	Fitness	X ₁₂	Popular products

These factors are categorised as: “Influence”, “Financial value” and “Health”. The first factor labelled as ‘influence’ explained 30.8% of the whole factors. This factor is represented by four items. Two of the items provide a very significant and high correlation value of the recommendation of friends (0.866) and the influence of advertisement or promotion (0.86). Another two items provide a correlation value between 0.60 and 0.78. From this study, the influence factor still affects consumers to buy coconut products.

The second factor is “Financial value” which has a variance ratio of almost half of the first factor of 18.19%. There are three items in the second factor cheap, local product and affordable. The third factor gives the smallest ratio of 9.45% namely “health”. There are three items in this third factor namely fitness, nutrition content and the function of disease treatment. As observed in *Table 6* only ten items are listed because the rest two items have been discarded because of weak correlation with a value of below 0.3. These two factors are ‘easy to store’ and ‘popular products in the market’.

Table 6. Varimax rotated component matrix

Purchasing factors of coconut products	Factor 1	Factor 2	Factor 3
Influences			
Friends	.866		
Advertisements	.860		
Packaging	.784		
Import	.654		
Financial value			
Cheap		.717	
Local products		.714	
Affordable		.608	
Health			
Fitness			.807
Nutrition content			.794
Disease treatment			.733
% Variance	30.861	18.192	9.45
% Cumulative variance	30.861	49.053	58.503
Eigen value	3.703	2.183	1.134

Conclusion

Knowing product consumer preferences helps businesses tailor their offerings to customer needs, improving sales and customer satisfaction. It also informs product development, marketing strategies, and resource allocation for better market competitiveness. Identifying the consumer preference for coconut products such as coconut water, coconut milk and others is important for marketers, researchers and farmers. Consumers were more likely to use fresh coconut milk (71%) followed by coconut milk UHT (26%) and coconut milk powder (3%). The finding shows the factors that influence consumers to consume coconut products were surrounding influence, financial value and health. Friends, advertisements, packaging and import product items provide a very significant and high correlation value.

These first factors explained 30.8% of the whole factors. Meanwhile, cheap, local products and affordable are three items in the second factor which has a variance ratio of almost half of the first factor of 18.19%. The third factor gives the smallest ratio of 9.45% namely “health”. There are three items in this third factor namely fitness, nutrition content and the function of disease treatment. Generally, consumers buy coconut products from various stores according to their needs and comfortable for themselves. This study indicates that hypermarkets and retail markets are the main choices of consumers. The greater mobility of the urban location has instigated the need for numerous and various services such as transport and restaurants influencing the potential buyers on the decision-making process when buying.

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Abstrak

Kecenderungan untuk membeli sesuatu produk boleh ditentukan oleh dimensi yang berkaitan dengan pengetahuan, tingkah laku dan latar belakang sosio-ekonomi pengguna. Penyelidik, pengeluar, pemasar dan pembuat dasar perlu lebih peka terhadap keperluan pengguna Malaysia dan meningkatkan keyakinan mereka ketika membeli produk makanan berasaskan kelapa. Artikel ini bertujuan untuk mengkaji tingkah laku pengguna dalam membeli produk kelapa. Selain itu, artikel ini memberi tumpuan kepada menentukan keutamaan penggunaan produk berasaskan kelapa seperti air kelapa, santan dan lain-lain. Sejumlah 649 pengguna telah ditemu bual menggunakan soal selidik berstruktur. Pengguna diminta untuk menunjukkan keutamaan mereka terhadap ciri-ciri kelapa, alasan memilih produk kelapa dan kekerapan pembelian produk kelapa. Pengguna juga turut diuji dengan pengetahuan mereka berkenaan varieti kelapa. Analisis deskriptif turut digunakan untuk mengukur peratusan trend tertinggi komposisi, yang kemudiannya diuji menggunakan ujian-t dan ujian chi-square. Selain itu, Analisis Faktor Eksploratori (EFA) digunakan untuk menentukan dimensi yang mendasari faktor konsumsi kelapa. Produk yang paling disukai adalah air kelapa, diikuti santan, jeli kelapa dan kerisik. Didapati sebanyak 60% pengguna tidak dapat membezakan kelapa berdasarkan varieti kelapa. EFA menunjukkan bahawa faktor yang mempengaruhi pengguna apabila menggunakan produk kelapa adalah pengaruh, nilai kewangan dan kesihatan.

