

A study of consumer behaviour towards mushroom-based products in Malaysia

(Kajian tingkah laku pengguna terhadap produk berasaskan cendawan di Malaysia)

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Keywords: mushroom-based products, consumer's preference, consumer's perception, factor analysis, Malaysia

Abstract

Mushroom is one of the famous foods in Malaysia. Consumers usually purchase fresh mushrooms, compared to the processed products. However, lately, consumers start to look at mushroom-based products due to many information about the health benefits of this product. However, information about the health benefits of this product has lately increased make consumers start to look at mushroom-based products. The objective of this study is to identify consumer behaviour towards mushroom-based products in Malaysia and explore the factors that have influenced consumers to purchase mushroom-based products. A survey involving 600 respondents representing major ethnic groups was carried out in peninsular Malaysia. This study showed that majority of mushroom-based consumers are people within the ages between 21 – 30. It also revealed that the factors that had a great influence to the purchase of mushroom-based products were product attributes, information on health benefits, certificate that indicates product quality and perception toward the products. Product with good taste is the most important criterion for consuming mushroom-based products. This is followed by scientific claims from authorised bodies concerning these products.

Introduction

Mushroom is a type of spore plant that can be eaten fresh or processed because it contains a lot of proteins, vitamins and minerals such as potassium (K) and phosphorus (P) which is important for health. Most species of mushrooms are saprophytes. Mushrooms are known as 'garbage collectors' because they clean up areas by degrading dead organic material, such as wood, leaves, needles and manure. Nowadays, many people take advantage of mushroom because of its unique taste, fibrous texture and health benefits. Moreover, people cultivated and

commercialised several types of edible mushroom that has a great demand around the world.

According to Sanchez (2010), the mushroom was consumed for its unique taste, and because of its medicinal aspects. Other study by Manzi et al. (1999) claimed that mushroom is a healthy food because its has low fat and calories, while higher in vegetable protein, chitin and minerals.

Although there are some previous studies about the mushroom industry scenario in Malaysia, the studies of consumer behaviour about the mushroom-based product in Malaysia is still lacking.

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Mushroom-based products are always associated with small and medium industries (SMIs). Malaysia has identified the mushroom as one of the seven industries that can contribute to the development of the agricultural sector. These industries are expected to contribute substantially around RM12.1 billion to the national economy. Therefore, the government takes initiative to set up a Mushroom Germplasma Culture Storage Centre to assist research and development activities in particular to identify types of mushrooms that have the potential to be commercialised as a functional food, or processed for industrial use, including nutraceuticals, cosmeceuticals and pharmaceuticals.

There is high demand for fresh and processed mushrooms in the local market. The per capita consumption of mushrooms is projected to increase from 1.0 kilograms in 2008 to 2.4 kilograms by 2020. Based on estimates made by the National Agro-food Policy (2011 – 2020), the demand for fresh and processed products is expected to grow in tandem with population growth and increased per capita consumption. The export value of mushrooms is projected to account for about RM300 million and grow around 16% per annum by 2020. This target can be achieved through an increase in production areas of 193 hectares in 2011 to 340 hectares in 2020. It is a big challenge for the government ensures this target can be achieved.

The purpose of the study is to identify consumer perceptions and behaviour towards mushroom-based product in Malaysia. The objective of this study is to identify the factors that influenced consumer's behaviour to purchase mushroom-based products in the market. This study is expected to provide some information and insights about consumer behaviours toward the purchased of mushroom-based products, and thus, enable the industry

to strategise the marketing efforts. Producers and marketers are also able to identify the types and products of mushroom-based the consumers are favoured.

Value-added products

Mushrooms have a unique flavour with great nutritional value, and are considered by many as an ingredient of gourmet cuisine (Valverde et al. 2015). Fresh mushrooms should be consumed within two to four days of harvesting (Marshall and Nair 2009, Kumar et al. 2014). However, processing the fresh mushroom will add the value and reduce the post harvest losses. The processed products have a longer shelf-life, better quality and taste. As a result, it increases the consumption (Kumar et al. 2014). The most popular mushroom-based products in the market are fried mushrooms, burger, pastry, nuggets, popcorn, pickles, biscuit, sauce, soup powder and candy (Kumar et al. 2014). It also can be used as an ingredient in the curry meals or satay (Mohd Tarmizi et al. 2013).

Medical purpose

Mushrooms have been appreciated for their high quality protein, excellent unsaturated fatty acids and high content of available vitamins (Marshall and Nair 2009; Amuneke et al. 2011; Bashir 2014; Kumar 2014; Valverde 2015). Mushrooms contain about 19 – 40% of protein (dry weight) which is double of the content in vegetables and four times that of oranges, and can be a possible alternative of meat (Amuneke et al. 2011; Alexander 2013; Bashir et al. 2014), while Marshall and Nair (2009) states that about 6% of edible mushrooms are known have medicinal properties and widely cultivated such as Ganoderma, Shiitake and Straw Mushroom.

Mushrooms have important sources of bioactive compounds and metabolites (Agriculture and Food Development Authority 2013; Valverde et al. 2015). These elements are considered as anti-bacterial and have cholesterol-lowering

effects (Agriculture and Food Development Authority 2013; Valverde et al. 2015), besides it can react as antiobesity and antidiabetic properties (Zheng et al. 2002; Agriculture and Food Development Authority 2013). The immunity agents were reported to stop tumor activity growth; and may be some antiHIV effects (Shirur 2011; Zhang et al. 2014). These elements will help patients that have Parkinson, Alzheimer, hypertension, and strokes problems (Valverde 2015) and could also reduce the risk of heart diseases.

Methodology

An empirical study was conducted in the peninsular Malaysia in 2016. The information and data were collected through a survey involving 600 respondents across peninsular Malaysia. In this study, the questionnaire was divided into four parts, namely the respondents' profile, the use of mushroom-based products, the factors affecting to buy and buying of mushroom-based products. *Table 1* shows the distribution of respondents by states in peninsular Malaysia.

According to Sudman (1976), the number of respondents of 600 or more is sufficient to obtain information using simple random sampling methods. Descriptive statistics were used to analyse and provide an overview and the status of consumer's consumption towards mushroom-based products. The analysis was performed using the Statistical Package for Social Science (SPSS). Analysis factor was also carried out to identify factors affecting the purchase of mushroom-based products.

Results and discussion

Profile of respondents

Around 54.7% of the respondents are female. The respondents comprised of 53.5% university graduated, 40.3% received a secondary certificate and 6.2% attended primary school. About half (52.7%) of respondents were 21 – 30 years old and 22.5% were 31 – 40 years old. The older generation (over 51 years old) only represents 12.5%. In term of profession, almost 50% were working in private sectors, 28.9% were self-employed and 21.7% were from public sectors. A total of 67.2% respondents earned between RM1,501 – RM3,000 per month and 69% of them spend less than RM50 a month to buy mushroom-based products (*Table 2*).

Level of knowledge towards mushroom-based products

Respondents were asked about their knowledge of the existence of mushroom-based products in the market. The results showed that around 62.5% of the respondents were not aware of the existence of mushroom-based products in the market (*Figure 1*). Most of the respondents only recognised the fresh mushrooms available on the market compared to other products that have been processed.

Table 1. Respondents distribution by state

States	Respondents (n)
Melaka	58
Johor	51
Perak	200
Selangor and Kuala Lumpur	92
Sarawak	36
Sabah	42
Terengganu	110

Table 2. Demographic profile of the respondents (n = 600)

	Percentage
Age	
21 – 30	52.7
31 – 40	22.5
41 – 50	12.3
>51	12.5
Gender	
Male	45.3
Female	54.7
Level of education	
Primary school	6.2
Secondary school	40.3
College/University	53.5
Profession	
Public sector	21.7
Private sector	49.4
Self-employed	28.9
Income	
<RM1,500	41.2
RM1,501 – RM3,000	26.0
RM3,001 – RM4,500	17.0
RM4,501 – RM6,000	10.3
>RM6,000	5.5
Amount spent for mushroom-based products	
<RM50	69.0
RM51 – RM100	23.2
RM101 – RM150	7.0
>RM201	0.8

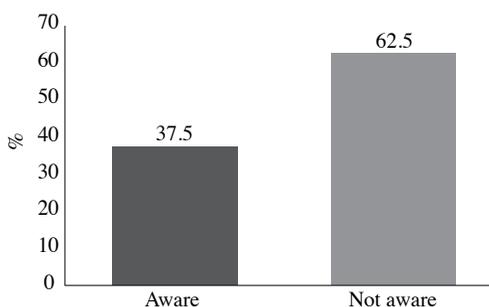


Figure 1. Knowledge of mushroom-based products

Consumer perception of mushroom-based products

Table 3 shows that respondents have different perception in buying products. Around 95.2% of the respondents agreed that they chose mushroom-based products because of its authenticity. In addition, 94.2% of consumers are concerned with the aspects of scientific authentication from authorised bodies to increase their trust and confidence in using mushroom-based products. Halal and MeSTI certificates from the Ministry of Health are also important because they will increase consumer confidence in term of the quality.

Figure 2 shows that most of the respondents like instant mushroom soup (61.7%) followed by body care products and cosmetics products from mushroom-based products. Instant mushroom soup products are already well-known in Malaysia market, so respondents are well-familiar with that products compare to others mushroom-based products.

The purpose of product

Research and development is the most important aspect in order to create new product or new functions/benefits. The producer/entrepreneur must understand what are the customer needs and wants from the products. Figure 3 shows that there were three purposes of using mushroom-based product namely for health benefits, as an alternative for diseases treatment and cosmetics. Around 74.6% of respondents decided to use mushroom-based product for the purpose of health practices.

Marketing channels

Seven marketing channels are listed in the questionnaire to gain information about how the consumers get the mushroom-based products. Figure 4 shows that 48% of the respondents get the mushroom-based products from supermarket and 40.5% from pasar tani.

Table 3. Consumer perceptions towards mushroom-based products

Description	No. respondents (n)	Yes (%)	No (%)
Authenticity of mushroom products	600	95.2	4.8
Good taste	600	87.3	12.7
Nutritional content	600	89.3	10.7
Scientific confirmation	600	94.2	5.8
Affordable	600	88.5	11.5

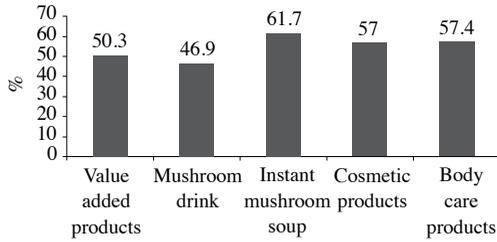


Figure 2. Mushroom-based products most liked (%)

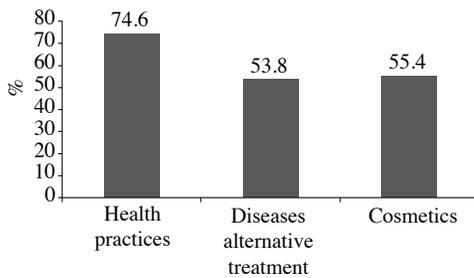


Figure 3. Purpose of products used

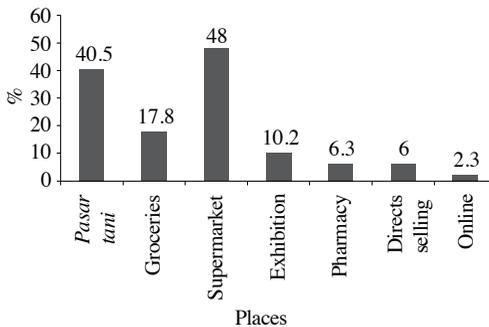


Figure 4. Marketing channels

Information resources

Nowadays, consumers have multiple options to get information resource of a product. A total of 69.5% respondents get the information about mushroom-based product from electronic media such as television, radio, Internet or social media and also printed media such as magazine, newspaper, brochure, and so on (Figure 5). It is the easiest way to access the information.

Purchasing factors

Many previous studies explained the link between consumers and marketing orientation in determining the pattern of buying food products and the direction of the food industry (Meulenberg and Viene 1998). Table 4 illustrates the KMO and Bartlett's test of sphericity test of sampling adequacy which has been initially performed on the data to confirm the appropriateness of conducting factor analysis (Tabachnick 2001). The KMO measure verified the sampling adequacy for the analysis with KMO = 0.888 with Bartlett's test ($p < 0.001$) being significant, indicating that the correlations between items were sufficiently large for factor analysis. Bartlett's test for sphericity showed that the correlation matrix was at an appropriate level to perform the factor analysis on the data for each scale, with all scales reaching the significant level of $p < 0.00$. The KMO measure provided a value between 0 and 1. A smaller value for the KMO would indicate that the factor analysis of the variables might not be appropriate since the correlations between the variables cannot be explained by the other variables (Norusis 1993).

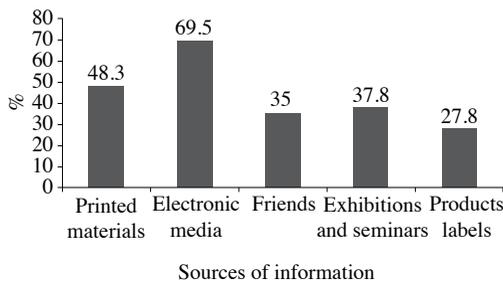


Figure 5. Mushroom-based product reference sources (%)

Table 4: Kaiser-Mayer-Olkin (KMO) and Bartlett's tests

The Kaiser-Meyer-Olkin paintings	Bartlett's Test and significant
0.888	5069.814
	153
	P = .000

Note: Bartlett's Test of Sphericity significant level $p < 0.000$ and Kaiser-Meyer-Olkin measure of sampling adequacy > 0.60

Table 4 shows the KMO and Bartlett's test value. The eigenvalues showed that the items contained more than one factor. A total of four factors/components had eigenvalues over Kaiser's criterion of more than one and the combination explained 62.97% of the variance.

Table 5 shows the items suggested for five components. Component 1 represents products attributes; Component 2 represents health benefits; Component 3 represents consumers' perception and Component 4 represents certification. Table 5 also shows the result of factor analysis of the purchasing selection criteria.

Component 1 – Products attributes was recognised as a first criterion that influenced the respondents in purchasing selection. This criterion consisted of six subcriteria. Price of mushroom-based products had the highest factor loading of 0.807 followed by easy store products (0.727) and nutrition content (0.698). The fourth subcriteria under

this component was disease treatment with factor loading 0.581 followed by local products (0.498) and the last subcriteria was taste (0.485). The result of this component showed that products attributes was the most outstanding criterion considered by respondents, especially on the price.

Component 2 – The second criterion was health and consists of three subcriteria: product authenticity with a factor loading of 0.80 followed by scientific confirmation (0.820) and MeSTI certificate. This result indicates that the mushroom-based products must have health factors to keep the demand from the market. Thus, information on the health benefit is important to consumers and this will lead them to purchase the mushroom-based products.

Component 3 – The third criterion was consumer's perception and it comprises three subcriteria: advertisement, which has a factor loading of 0.845, influence by friends (0.825) and packaging label of products (0.583). The industry players have a high consideration of the consumer's perceptions to ensure that their efforts can contribute to a positive impact on the local demand.

Component 4 – Certificate from authorised body is the last criterion extracted by EFA. This criterion has three subcriteria comprising HACCP scientific information with the highest factor loading of 0.858, followed by Good Manufacturing Practices certificate (0.816), and Halal certification (0.641). This result suggested that the products should have approval certificates from authorised body to fulfil the needs of respondents for certain products to be commercialised.

Table 5: Matrix component based on VARIMAX rotational form factors

Things that affect purchases	Component 1	Component 2	Component 3	Component 4
Product attributes				
Taste	0.485			
Nutrition	0.698			
Price	0.807			
Easy to store	0.727			
Local products	0.498			
Disease treatment	0.581			
Health benefits				
Product authenticity		0.80		
MeSTI		0.65		
Scientific confirmation		0.82		
Perceptions				
Advertisement			0.845	
Friends			0.825	
Product label			0.583	
Certifications				
Halal				0.641
HACCP				0.858
GMP				0.816
Eigenvalue	3.796	2.272	2.253	2.315
Eigen cumulative ratio (%)	62.969			

Conclusion and recommendations

This research provided many good lessons and insights on the mushroom industry and supports the decision-making process especially for products developed from mushroom. The decisions made by policy makers, researchers and entrepreneurs (including growers) were used to develop the selection criteria. This was because these developments provided an impact on their projects or plans. The Factor Analysis was conducted which elicited the mushroom-based products selection model that contained four groups of criteria. The result of this study could be used as a guideline for

the industry to identify factors that influence consumers to purchase the mushroom-based products. It can also be used as a strategy to introduce mushroom as the country's flagship that will give high returns to the national economy. The model developed may provide useful decision making tools for mushroom entrepreneurs in selecting the most suitable mushroom to be processed based on consumer demand or criteria. The positive perceptions of mushroom-based products have proved that the producer has potential to expand market and they need attention from the government agencies.

References

- Agriculture and Food Development Authority (2013). Mushroom sector development plan to 2020
- Alexander, S. (2013). How to grow your own oyster mushrooms on straw. The Premature Research Institute
- Amuneke, E.H., Dike, K.S. and Ogbulie, J.N. (2011). Cultivation of *Pleurotus ostreatus*: An edible mushroom from agrobased waste products. *Journal of Microbiology and Biotechnology Research* 1: 1 – 14
- Bashir, A., Vaida, N. and Ahmad Dar, M. (2014). Medicinal importance of mushrooms: A review. *International Journal of Advanced Research* 2: 1 – 4
- Chang ST. (2008). *Overview of mushrooms cultivation and utilization of functional foods*. In: *Mushrooms as Functional Foods*, Edited by Cheung PCK (edt.). John Wiley and Sons, Inc. pp. 1 – 33
- Dasar Agromakanan Negara (2011 – 2020). Bab 7: Memacu Pertumbuhan Pertanian Bernilai Tinggi. Pp 96-98. Retrieved on 30 Dec. 2012 from <http://www.moa.gov.my/web/guest/dasar-agromakanan-negara-2011-2020-dan>
- Kumar, S., Chand, G., Srivastava, J.N. and Md. Shamsheer, A. (2014). Postharvest technology of Button mushroom: A socio-economic feasibility. *Journal of Postharvest Technology* 2: 136 – 145
- Manzi, P., Gambelli, L., Marconi, S., Vivanti, V. and Pizzoferrato, L. (1999). Nutrients in edible mushrooms: an inter-species comparative study. *Food Chemistry* 65(4): 477 – 482
- Marshall, E. and Nair, N.G. (2009). Make money by growing mushrooms. Food and Agriculture Organization (FAO) of The United Nations: Rome
- Meulenbergh, M. and Vience, J. (1998). Changing food marketing system in Western Countries. *British Food Journal* 102(7): 522 – 538
- Mohd Tarmizi, H., Hairazi, R. and Rozhan, A.D. (2013). Understanding the mushroom industry and its marketing strategies for fresh produce in Malaysia. *Economic and Technology Management Review* 8: 27 – 37
- Norusis, M.J. (1993). Professional Statistics, Release 6.0. In: SPSS for Windows, p. 47 – 82. Chicago: SPSS Inc.
- Sanchez C. (2010). Cultivation of *Pleurotus ostreatus* and other edible mushrooms. *Applied Microbiology and Biotechnology* 85: 1321 – 1337
- Saunders, M., Lewis, P. and Thorhill, A. (2003). *Research Method for business students*. Edisi ke-3. Harlow: Prentice Hall
- Shirur, M. (2011). Round the Year Cultivation of Mushrooms. In: Manjit, S., Vijay, B., Kamal, S., Wakchaure, G.C. (Eds.), *Mushrooms cultivation, marketing and consumption*. Indian Council of Agricultural Research
- Sudman, S. (1976). *Aplied sampling*. New York: Academic Press
- Tabachnick, B.G. and Fidell, L.S. (2001). *Using multivariate statistics*, 4th ed., Boston: Allyn and Bacon
- Valverde, M. E., Hernandez-Perez, T. and Paredes-Lopez, O. (2015). Edible mushrooms: Improving human health and promoting quality life. *International Journal of Microbiology*: 1 – 14
- Zhang, Y., Geng, W., Shen, Y., Wang, Y. and Dai, Y. (2014). Edible mushroom cultivation for food security and rural development in China: bio-innovation, technological dissemination and marketing. *Sustainability* 6: 2961 – 2973
- Zheng, S., Liu, Q., Wang, H. and Ng, T.B. (2002). Can edible mushrooms promote sustainability in Beijing. *Mycological Research* 106: 754 – 756

Abstrak

Cendawan merupakan salah satu sumber makanan yang popular di Malaysia. Pengguna lebih menggemari cendawan dalam bentuk segar berbanding dengan produk berasaskan cendawan yang telah diproses, Walau bagaimanapun, kebelakangan ini produk cendawan telah mendapat permintaan dalam kalangan pengguna kerana maklumat mengenai kebaikan kesihatan ini semakin meningkat menyebabkan pengguna sudah mula mencari maklumat mengenai produk berasaskan cendawan. Objektif kajian ini untuk menilai tingkah laku pengguna terhadap produk berasaskan cendawan di Malaysia dan meninjau faktor-faktor yang mempengaruhi pengguna untuk membeli. Kajian melibatkan seramai 600 pengguna meliputi pelbagai etnik di seluruh semenanjung Malaysia. Kajian mendapati majoriti pengguna berumur di antara 21 – 30 tahun. Hasil kajian turut mendedahkan bahawa, faktor seperti produk atribut (elemen), maklumat kebaikan kesihatan, pensijilan kualiti produk dan persepsi terhadap produk merupakan faktor-faktor utama yang mempengaruhi pengguna untuk membeli produk berasaskan cendawan. Produk yang mempunyai rasa yang bagus merupakan ciri utama pengguna menggunakan produk berasaskan cendawan ini diikuti oleh pengesahan saintifik dari badan-badan yang diberi kuasa berkenaan produk-produk ini.