Journal of Agribusiness Marketing • Vol. 6 (2013):37- 51

CONSUMER PREFERENCE FOR JACKFRUIT VARIETIES IN MALAYSIA

Norhashila Ismail*
Bisant Kaur

ABSTRACT

Artocarpus heterophyllus Lam., or jackfruit, is a non-seasonal plant with many uses. There are new varieties of this fruit with unknown consumer acceptance to its taste, aroma and texture. A fruit party was held to conduct a study on the consumer preference for three varieties of jackfruit, i.e. Tekam Yellow, Mastura and Mantin. A total of 251 respondents participated in this study. The taste test was carried out single-blind i.e., the varieties of jackfruit tested were not known to the respondents and they were asked to give their opinions using a Likert scale. The survey found that the main characteristic that should be emphasized is the pulp texture being less juicy. Nevertheless, the sweetness and the aroma were also important. Consumers generally preferred the Tekam Yellow variety because its texture was less juicy, and because it tasted sweeter than Mantin and Mastura. It was also found that colour does not significantly affect the consumer preference. Malaysian consumers generally prefer fresh fruit which is sweet rather than sour. Even though consumers generally like juicy fresh fruit, producers and marketers still need to ensure those traits do not interfere with the crunchiness of the fruit. The study concluded that agricultural researchers need to focus on new varieties of jackfruit which are less juicy, but still sweet.

Keywords: Tekam Yellow, Mantin, Mastura, jackfruit, consumer behaviour, taste test, Malaysia, consumer preference.

INTRODUCTION

There is an old Sri Lankan proverb that says, "with jak and coconut in your backyard you will never starve" (Haq, 2006). This is because every part of the jackfruit tree is useful (Table 1). Unripe jackfruit can be cooked with chicken, fish and eggs, and ripe ones can be eaten as-is or processed into drinks, jam, jelly or candy. The same applies to other parts of the tree such as the skin, leaves, flowers, wood and latex which have their own uses and benefits.

**Federal Agricultural Marketing Authority*
E-mail: norhashila@fama.gov.my

Table 1: The Uses of the Jackfruit Tree

Part	Uses
Jackfruit	Unripe fruit can be cooked as a vegetable dish and eaten with rice. It can also be cooked with chicken, fish and eggs.
Jackfruit pulp	• The ripe fruit is eaten as dessert, made into jam, pickles, jelly or candy. • Ice cream, drinks, powdered drink. • Pulp leather.
Jackfruit skin	Nutritious food for livestock, especially goats.
Jackfruit seed	Boiled or fried and eaten as a snack or made into powder as a cooking ingredient.
Leaves and flowers	Eaten as salad.
Wood	Made into furniture.
Latex	Made into varnish.

Source: Haq, 2006

Jackfruit is a non-seasonal fruit which is also known by the botanical name of *Artocarpus heterophyllus* Lam, and is a part of the family *Moraceae* (Haq, 2006; FAMA, 2004) The fruit has its origins in India and Southeast Asia. It was then spread to other countries such as Australia, Brazil, and Indonesia (Table 2). There are also views that jackfruit originated from Malaysia. Jackfruit is known by various names, such as Nangka in Malay, Jacca in Dutch, Jacabaum in German, Jaqueira in Portuguese and Jack in French. Table 3 shows the local names for jackfruit in different countries. The Philippines is another country which calls jackfruit 'Nangka' as it is called in Malaysia.

Table 2: Distribution of Jackfruit by Country

Origin	Distribution or Dispersion
Bangladesh	Algeria, Angola, Australia
India	Benin, Bolivia, Botswana, Brazil, Burkina Faso, Burundi
Malaysia	Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, China, Comoros, Costa Rica, Côte d'Ivoire (Ivory Coast) Democratic Republic of Congo, Djibouti Ecuador, Egypt, Equatorial Guinea, Eritrea, Ethiopia Fiji Gabon, Gambia, Ghana, Guinea, Guinea-Bissau Honduras Indonesia, Ivory Coast (Côte d'Ivoire) Jamaica Kenya Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Myanmar Namibia, Nepal, Niger, Nigeria Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines Rwanda

Table 2 (continued)

Origin	Distribution or Dispersion
	São Tomé & Príncipe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sri Lanka, St. Vincent, Sudan, Surinam, Swaziland, Tanzania, Thailand, Timor, Togo, Tunisia, Uganda, United States (Florida, Hawaii) Vietnam Zambia, Zimbabwe

Source: ICRAF Database, Bowe (pers.com., 2003) In Haq (2006).

Table 3: Common Names for Jackfruit According to Country

Country	Common Names
Bangladesh	Kanthal
Brazil	Jaca
Cambodia	Khnor pr Khnaôr
China	Po-lo-mi
Columbia	Jaqueira
Cuba	Rima
Guyana	Cartahar
India	Kanthal, Kathal, Kantaka, Jaka, Palaamaram (Tamil), Pilavu chakka (Malayalam), Halasu (Kanarese), Panasa (Telugu)
Indonesia	Nangka, Nongka, Lamasa, Malasa
Laos	Mak mi, May mi, Miiz or Mizz hnang
Malaysia	Nangka, Tsjaka, Jaka
Myanmar	Peignai
Nepal	Rookh-Katahar
Nicaragua	Castaňo
Papua New Guinea	Kapiak
Philippines	Langka or Nangka (Tagalog, Bisaya, Ilocano) Nanka or Lanka (Tagalog, Bisaya), Sagakat (Mountain Province), Badak (Cagayan), Ananka (Ilocano), Yanka (Kapampangan), Ubiyen (Ibanag)
Sri Lanka	Jak, Palaamaram
Thailand	Khanun, Makmi, Banun
U.S.A: Puerto Rico	Jaca
Vietnam	Mit
Zanzibar	Fenesi

Source: ICRAF Database, Bowe (pers.com., 2003) In Haq (2006).

In Malaysia, the planted area as well as the yield has increased consistently from 2005. The supply of this crop is influenced by the weather and crop management. However, jackfruit is significant in terms of contribution to the value of agricultural production in Malaysia. In 2008, the production value reached RM61,519,278 with a production of 26,748 tonnes valued at RM2.29 per kg (Table 4). This dropped to 19,614 tonnes in 2011 with a production value of RM44,707,339. In 2010, the states which recorded the highest production values were Selangor (RM11,157,750) and Sabah (RM10,198,350) (Table 5).

Table 4: Planted Area and Production of Jackfruit in 2005-2011

Year	Planted Area (Hectare)	Productive Area (Hectare)	Average Yield (Mt/ha)	Production (MT)	Production Value (RM)
2005	3,133	1,754	10.0	17,624	44,137,080
2006	3,123	1,748	10.7	18,712	34,381,429
2007	3,201	1,836	10.0	18,415	34,986,420
2008	3,340	1,957	13.7	26,748	61,519,278
2009	3,359	1,975	10.1	19,934	45,847,554
2010	3,516	2,015	9.7	19,516	44,483,050
2011p	3,534	2,012	9.7	19,614	44,707,339

Source: Perangkaan Agromakanan 2011, Ministry of Agriculture and Agro-based Industry Malaysia

Table 5: Area, Production and Production Values of Jackfruit Cultivation by States in Malaysia, 2010

State	Area (Ha)	Productive Area (Ha)	Production (MT)	Production Value (RM)
Johor	404.8	318.5	959.2	2,158,197
Kedah	201.2	148.2	1,031.9	2,321,793
Kelantan	214.5	141.0	1,137.4	2,559,247
Melaka	90.0	85.0	1,469.0	3,305,250
Negeri Sembilan	371.0	164.2	1,413.7	3,180,870
Pahang	749.6	167.3	825.2	1,856,599
Perak	93.2	55.8	892.7	2,008,638
Perlis	14.0	14.0	1.9	4.163
Penang	48.5	35.0	241.5	543.308
Selangor	435.9	275.5	4,959.0	11,157,750
Terengganu	6.8	3.1	4.2	9.522
Sabah	382.9	334.0	4,532.6	10,198,350
Sarawak	488.4	262.5	1,909.8	4,869,990
Federal Territory Labuan	15.0	11.0	137.5	309.375
Malaysia	**3,515.8**	**2,015.1**	**19,515.6**	**44,483,050**

Source: Perangkaan Agromakanan 2011, Ministry of Agriculture and Agro-based Industry Malaysia

In 2001, several jackfruit clones were recommended to be grown commercially, including the J29, J31 (NS1) and J3 clones (FAMA, 2001). These clones had good demand in the market because their sizes were not too large, their pulp was fleshy, smooth and sweet (more than 13% Brix), and their colours are strong. However, in 2011, there were new jackfruit clones with unknown consumer acceptance of their characteristics. These clones were J32 known as Mantin, J33 known as Tekam Yellow, and J35 known as Mastura (Table 6). This is because most studies for jackfruit focused on technical research such as pest surveys and on finding new jackfruit clones with high yields, whereas consumer surveys are also very important in guiding the choosing of clones or varieties that meet the demands and requirements of the consumer market (Ritthiruangdej, Srikamnoy, & Amatayakul, 2011). The high yield of fruit does not guarantee marketability if consumers do not like the produce. This will contribute to fruit dumping later. Because the characteristics of jackfruit varies according to its variety (Haq, 2006), the study of consumer acceptance to jackfruit's characteristics is very important to growers and marketers during their decision-making process (Horsburgh & Noller, 2005).

Table 6: Differences between Mantin (J32), Tekam Yellow (J33) and Mastura (J35)

Characteristics	Mantin	Tekam Yellow	Mastura
Reg. Number	J32	J33	J35
Origin	Negeri Sembilan	Rawang, Selangor	Crossbreed of CJ1 & CJ6 varieties
Average Weight (per fruit)	15 - 20 Kg	16 - 20 Kg	15 - 25 kg (The weight can reach more than 40 kg with good management)
Skin Colour of Ripe Fruits	Yellowish green	Yellowish green	Yellowish green
Shape	Oblong	Oblong	Oblong with tapered shoulder
Bulb	Thick & firm	Thin	Thick
Colour of Bulb	Orange	Yellow	Golden yellow
Taste/Texture	Mildly sweet, moist, a bit hard	Very sweet, crunchy & soft	Sweet & Firm
Production of Latex	High	High	Low

Source: Farmers' Organization Authority, 2011

LITERATURE REVIEW

The marketing of agricultural produce or products with high value can help small farmers and landless labourers to increase their income because it would create jobs and increase agricultural yield (Weinberger & Lumpkin, 2006). However, the success of agricultural produce or products depends on the demands and expectations of today's consumers who have better buying power (Weinberger & Lumpkin, 2006). Foxall (1984) stated that it is essential to provide information on new products before they are marketed. This also applies to fresh items such as fruits. Producers and marketers need more information before making the decision of what agricultural product or produce to plant and market (Kappel, Fisher-Fleming, & Hogue, 1995). The results will determine the success of that agricultural produce later (Foxall, 1984). Moreover, the decision to invest in high-quality agricultural produce can be made with more precision.

During collection of information regarding consumer preference, Kappel et al. (1995) listed a variety of methods used to make the evaluation prior to the cultivation of fruits, such as characteristics and storage of harvested produce. Kappel et al. (1995) also stated that the information required is the sensory characteristics of the fruit. Among the sensory characteristics to be studied are sizes, colour, shape, and sweetness which give satisfaction to consumers. In the Kappel et al. (1995) study involving 496 consumers to examine the size, colour, flavour, texture and the overall quality of some types of pears, respondents were required to do a taste test, and their views were solicited only after they had undergone the taste test. Similarly, Ritthiruangdej et al. (2011) examined the size, colour, flavour and texture in their study on consumer preferences for jackfruit sauce using sensory analysis. The taste test is essential in obtaining a more accurate view of fruit consumers.

Generally, 100g of jackfruit pulp contains 84.64g of moisture, 1.28g of ash, 1.43g of protein, 0.05g of fat, 12.6g of carbs, 3.05g of dietary fibre, 57.15g of energy, 8.15g of vitamin C and 10.91g of sugar (Table 7). The composition of jackfruit pulp will certainly affect its sensory attributes. Dardak (2011) stated that the characteristics of jackfruit preferred by Malaysian consumers are indicated by the NS9 variety, which has a greenish yellow pulp that can be processed into beverages, frozen fruit or jackfruit chips (Table 8). However, there are new varieties such as Tekam Yellow and Mantin that need to be studied to ascertain their reception by consumers.

Table 7: Nutrition in 100g of Jackfruit Pulp

Item	Total Content in 100g
Moisture	84.64 g
Ash	1.28 g
Protein	1.43 g
Fat	0.05 g
Carbohydrate	12.6 g
Dietary Fibre	3.05 g
Energy	57.15 g
Vitamin C	8.15 g
Sugar	10.91 g

Source: Sahira Akmar Zulkepli, Haslina Hassan, Norfaiza Ismail, and Faridatul Akmar Mohamad Nuri, Khasiat Semula Jadi Buah-Buahan Tropika, AGROMEDIA Bil. 35 2/2011, MARDI: Serdang.

Table 8: Jackfruit Pulp Characteristics Preferred by Malaysian Consumers

Item	Physical Characteristics
Suggested variety	NS9
Maturity Index	Greenish yellow
Quantity	10kg for whole fruit
	Minimum 300g/pack for processed fruit
Pulp Colour	Golden yellow
Processing	Minimal processing
	Frozen
	Jackfruit chips

Source: Rozhan Abu Dardak (2011), Pemasaran buah-buahan untuk pasaran tempatan, AGROMEDIA Bil.35 2/2011, MARDI: Serdang.

METHODOLOGY

A descriptive study using a structured questionnaire was chosen to obtain organised and accurate information. The information-gathering method used in this survey was through survey questions in a questionnaire form. Ten enumerators were trained to assist in facilitating respondents in giving feedback during the field survey.

The questionnaire was divided into a few sections to gather the required information, i.e., 1) General information about consumer behaviour regarding fresh fruit; 2) General consumer behaviour regarding fresh-fruit taste test; 3) Taste test for the three varieties of fresh jackfruit; and 4) The profile of the respondents. Likert scale (i.e., 1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly Agree or 1-Very Dry, 2-Dry, 3-Neutral, 4-Juicy, 5-Very Juicy) is used to determine the level of consumer acceptance of the characteristics taste-tested in the survey in general and the three samples of fresh jackfruit.

The study was carried out during a fruit party where the respondents who attended the event were consumers. Three varieties of fresh jackfruit - J32 (Mantin), J33 (Tekam Yellow) and J35 (Mastura) were provided in separate transparent plastic containers and marked with yellow stickers (1) for Tekam Yellow variety, pink stickers (2) for Mastura variety and green stickers (3) for Mantin variety to differentiate among the three varieties. Each respondent was required to taste the three samples of fresh jackfruit before answering the questionnaire. Coffee beans and mineral water were used to neutralize the aroma and taste after each tasting sample. Respondents did not know which jackfruit varieties they tasted when answering the questions in the survey form. The numbers of respondents for this study was 251 people chosen by convenience sampling. Out of that number, 60 percent of the respondents were male and 40 percent were female.

Regression and correlation analysis were used to provide information on consumer behaviour towards characteristics of jackfruit. Regression analysis shows the main characteristics influencing consumers when buying fresh jackfruit. The correlation on the other hand indicates the strength of the relationship among the characteristics influencing consumers' fondness for jackfruit. The method of analysis also used descriptive analytical technique and frequency distribution to show consumer preference towards the three jackfruit varieties. A cross-tabulation technique was also used to indicate the preference of consumers according to selected profile groups. The scale in Table 9 and Table 10 used to interpret consumer preference is based on the statistical requirements when using mean scores in an analysis. Mean scores are used to determine the average of consumer acceptance. The use of frequencies and percentages of consumption are used to make more detailed observations.

Table 9: Example of Mean Score Scale from Likert Scale Data

Likert Scale	Mean*
1- Strongly Disagree	1.00 - 1.80
2- Disagree	1.81 - 2.60
3- Neutral	2.61 - 3.40
4- Agree	3.41 - 4.20
5- Strongly Agree	4.21 - 5.00

**The scale mean is calculated using the formula (n-1)/n*

Table 10: Example of Mean Score Scale from Likert Scale Data

Likert Scale	Mean*
1- Very Dry	1.00 - 1.80
2- Dry	1.81 - 2.60
3- Neutral	2.61 - 3.40
4- Juicy	3.41 - 4.20
5- Very Juicy	4.21 - 5.00

**The scale mean is calculated using the formula (n-1)/n*

FINDINGS AND DISCUSSION

From the respondents who came to the taste test, 98 percent stated that they liked jackfruit while 2 percent disliked but were still consumers of jackfruit (Table 11). The reliability test for items tested in the questionnaire is 0.7622. This means that the accuracy of the findings of this study compared to the population was 76.22 percent.

Table 11: Consumer Behaviour towards Fresh Jackfruit

Consumer Behaviour	Nos.	Percentage (%)
Like	246	98
Dislike	5	2
Total	251	100

The respondent profile shows that the items that could be used in demographic analysis are gender and age of the respondents. The respondents consisted of 57.77 percent male and 42.23 percent female (Table 12). In terms of age distribution, respondents aged 20 years and below were 9.16 percent, 21 to 30 years 39.84 percent, 31 to 40 years 22.71 percent, 41 to 50 years 20.32 percent, 51 to 60 years 6.37 percent and 1.59 percent were above 60 years old.

The findings show that 60 percent of the consumers consumed fruits at least twice a week (Table 13). The consumers also indicated that they preferred to buy uncut fresh fruits (86.06 percent) compared to buying fresh fruit that has been cut and packed (13.94 percent) (Table 14). Most of the consumers said that they buy fresh fruits in supermarkets (110 respondents), night markets (87 respondents) and Farmers' Markets (74 respondents) (Table 15).

Table 12: Profile of Respondents

Category	Nos.	Percentage (%)
Gender		
Male	145	57.77
Female	106	42.23
Age		
20 years and below	23	9.16
21-30 years	100	39.84
31-40 years	57	22.71
41-50 years	51	20.32
51-60 years	16	6.37
Above 60 years	4	1.59
Race		
Malay	227	90.44
Chinese	10	3.98
Indian	11	4.38
Others	3	1.20

Table 12 (continued)

Category	Nos.	Percentage (%)
Occupation		
Student	25	9.96
Government Servant	181	72.11
Private Staff	30	11.95
Others	15	5.98

Table 13: Cross Tabulation of Fruit Consumption in a Week and Respondents' Profile

Profile	Frequency of Fruit Consumption in a Week									
	1 time		2 times		3-7 times		> 7 times		None	
	No.*	%	No.*	%	No.*	%	No.*	%	No.*	%
Age										
(years)	6	2	4	2	5	2	6	2	2	0.8
20	34	14	35	14	22	9	4	2	5	2
21-30	19	8	13	5	12	5	10	4	3	1
31-40	21	8	11	4	6	2	11	4	2	0.8
41-50	5	2	5	2	3	1	0.3	1	0	0
51-60	3	1	0.3	0	0	0	1	0.3	0	0
> 60										
Gender										
Male	51	20	40	16	30	12	16	6	8	3
Female	37	15	28	11	18	7	19	8	4	2
Total	88	35	68	27	48	19	35	14	12	5

*** Refers to number of respondents**

Table 14: Type of Fresh Fruit Purchased

Type of Fresh Fruit Purchased	No. of Respondents	Percentage (%)
Uncut	216	86.06
Cut and packed	35	13.94
Total	251	100

Table 15: Place of Fruit Purchase

Location	No. of Respondents
Fruit stalls	58
Supermarkets	110
Farmers Markets	74
Night Markets	87
Fresh Fruit Stalls	9
Others	14

General Preferences for Fresh Fruits

In general, the findings in Table 16 indicate that consumers of fresh fruits are very fond of sweet fruits (mean score: 4.46), love fruits with strong aroma (mean score: 4:12), brightly coloured fruits (mean score: 4.16), crunchy texture (mean score: 4:17), and juicy fruits (mean score: 3.95); but do not like sour fruits (mean score: 2.84) (Table 16). Therefore, fruit producers and marketers should take into account the characteristics of fresh fruits preferred by consumers as indicated above when deciding on the varieties to cultivate or market.

Table 16: Consumer Behaviour Mean Scores for Fruit Characteristics Tested

Fruit Characteristics	Mean Score
Sweet	4.46
Sour	2.84
Strong aroma	4.12
Brightly coloured flesh	4.16
Crunchy texture	4.17
Juicy texture	3.95

General Consumer Behaviour towards Jackfruit Characteristics

On the key selection factors when buying fresh jackfruit, 82 percent of respondents indicate that taste is the main factor that will influence their decision-making (Table 17).

Table 17: Main Selection Factors When Purchasing Fresh Jackfruit

Factor	Nos.	Percentage (%)
Taste	206	82
Aroma	18	7
Colour	19	8
Texture	8	3
Total	251	100

Overall, the findings of this study indicate that there is a direct relationship between consumer preference and the particular characteristics of fresh jackfruit, except when the taste is bland. The blander the taste, the less it is liked by consumers. As mentioned earlier, consumers are very fond of sweet fruits. However, two factors that were tested, i.e., bland taste and colour, are not significant in influencing fresh jackfruit consumer preference. Out of the three significant factors, jackfruit texture is the most influential to consumer preference with a beta coefficient of 0.416, followed by sweetness (0.321) and aroma (0.157) (Table 18). The positive correlation between sweetness and texture (0.463) is very similar to the correlation of sweetness and aroma (0.430), as well as the correlation between texture and aroma (0.495) (Table 19). Therefore, these three characteristics should be taken seriously by producers or marketers of agricultural products when marketing jackfruit.

Table 18: Regression of Positive Consumer Preference for Fresh Jackfruit

	Non-standardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.456	.150		3,033	.003
Sweet Taste	.321	.029	.331	10,956	.000
Bland Taste	-.041	.025	-.043	-1,641	.101
Colour	.024	.030	.022	.797	.425
Aroma	.157	.035	.144	4,514	.000
Texture	.416	.034	.386	12,215	.000

*** Significant at level 0.01 (2-tailed)*

Table 19: Correlation Factors Influencing Positive Preference for Jackfruit

Independent Factors		Sweet Taste	Bland Taste	Colour	Aroma	Texture
Sweet Taste	Pearson Correlation	1	.018	.140**	.430**	.463**
	Sig. (2-tailed)	.	.623	.000	.000	.000
	N	753	753	753	753	753
Bland Taste	Pearson Correlation	.018	1	.192**	.133**	.016
	Sig. (2-tailed)	.623	.	.000	.000	.670
	N	753	753	753	753	753
Colour	Pearson Correlation	.140**	.192**	1	.314**	.237**
	Sig. (2-tailed)	.000	.000	.	.000	.000
	N	753	753	753	753	753
Aroma	Pearson Correlation	.430**	.133**	.314*	1	.495**
	Sig. (2-tailed)	.000	.000	.000	.	.000
	N	753	753	753	753	753
Texture	Pearson Correlation	.463**	.016	.237**	.495**	1
	Sig. (2-tailed)	.000	.670	.000	.000	.
	N	753	753	753	753	753

*** Correlation is significant at level 0.01 (2-tailed).*

Consumer Preference for Jackfruit Varieties

The findings show that 77.29 percent of consumers prefer Tekam Yellow, while 17.13 percent prefer the Mastura variety, and 5.58 percent prefer the Mantin variety (Table 20). Through this taste test, respondents identified Tekam Yellow as the variety of their choice with a mean score of 4.39 (Table 21).

Table 20: Consumer Preference for Jackfruit Varieties

Variety	Nos.	Percentage (%)
Tekam Yellow	194	77.29
Mastura	43	17.13
Mantin	14	5.58
Total	251	100

Table 21: Mean Scores for Consumer Preference of Jackfruit Varieties

Variety	Mean Score
Tekam Yellow	4.39
Mastura	3.48
Mantin	3.02

When the characteristics of Tekam Yellow were reviewed, the mean scores which showed significant differences were the fruit's sweetness and texture. In the consumers' opinion, the Tekam Yellow is sweeter (mean score: 4.39) and the texture is less juicy (mean score 1.78) as compared to the Mastura and Mantin varieties (Table 22). This is in line with consumer preferences as mentioned earlier where they prefer fruits that are sweet and crunchy.

Table 22: Mean Scores for Taste Test of Characteristics of the Three Jackfruit Varieties

Variety	Mean Score			
	Sweet Taste	Colour	Aroma	Texture (Juicy)
Tekam Yellow	4.39	3.45	3.88	1.78
Mastura	3.52	3.79	3.67	3.34
Mantin	2.62	3.69	3.18	3.91

CONCLUSIONS

The findings of this study determined that Malaysian consumers generally prefer very sweet jackfruit that is less juicy and has a crunchy texture. Malaysian consumers also prefer fresh fruit which has a distinctive aroma.

In particular, the main characteristic to take into consideration when making the decision to cultivate jackfruit is that the texture of the fruit should be less juicy. However, the sweetness and the aroma must also be taken into consideration. The colour of the pulp does not really influence the consumer when they buy or eat jackfruit as long as it is yellow in colour. Consumers prefer the pulp of the Tekam Yellow variety because the texture is less juicy and it is sweeter than the Mantin and Mastura varieties.

The findings of this study are expected to guide farmers and marketers when making decisions about the cultivation of jackfruit in particular, and to provide information about consumer behaviour towards characteristics of fresh fruits in general.

Acknowledgements

The authors would like to thank the Director–General of FAMA for permission to carry out this study. We are also grateful for the assistance provided by officers from the Division of Market Information and Division of Contract Farming, Federal Agricultural Marketing Authority (FAMA), during data collection.

References

Awang, M.R. (2011). Ciri-ciri varieti nangka. Lembaga Pertubuhan Peladang.

Dardak, R.A. (2011). Pemasaran buah-buahan untuk pasaran tempatan. AGROMEDIA Bil.35 2/2011. MARDI: Serdang.

Elevitch C.R., & Manner H.I. (2006). Species profiles for Pacific Island agroforestry. Retrieved from http://www.traditionaltree.org

FAMA (2001). Siri panduan kualiti nangka. FAMA : Kuala Lumpur.

FAMA (2004). Analisis industri komoditi nangka. FAMA: Kuala Lumpur.

Foxall, G. (1984). Predicting consumer choice in new product development: Attitudes, intentions and behaviour revisited. *Marketing Intelligence & Planning, 2*(1), 37-52.

Haq, N. (2006). *Jackfruit: Artocarpus heterophyllus*. Southampthom Centre for Underutilised Crops, University of Southompton, Southampton: UK.

Horsburgh, C., & Noller, J. (2005). *Exotic tropical fruits and vegetables, category marketing opportunities*. Rural Industries Research and Development Corporation: Australia.

Kappel, F., Fisher-Fleming, R., & Hogue, E.J. (1995). Ideal pear sensory attributes and fruit characteristics. *HortScience, 30*(5), 988-993.

MoA. (2012). *Perangkaan agromakanan 2011*, Kementerian Pertanian dan Industri Asas Tani Malaysia: Putrajaya.

Ritthiruangdej, P., Srikamnoy, W., & Amatayakul, T. (2011). Optimization of jackfruit sauce formulation using response surface methodology. *Kasetsart Journal (Nat. Sci.) 45*, 325-334.

Weinberger, K., & Lumpkin, T.A. (2006). *High value agricultural products in Asia and the Pacific for small-holder farmers: Trends, opportunities and research priorities*. Workshop on "How can the poor benefit from the growing markets for high value agricultural products", October 3-5 2005, CIAT, Cali, Colombia.

Zulkepli, S.A., Hassan, H., Ismail, N., & Nuri, F.A.M. (2011). Khasiat semulajadi buah-buahan tropika. AGROMEDIA Bil.35 2/2011. MARDI: Serdang.