

## Perceptions and acceptance of 'belacan' in Malaysian dishes

<sup>1</sup>Leong, Q. L., <sup>1\*</sup>Ab Karim, S., <sup>2</sup>Selamat, J., <sup>3</sup>Mohd Adzahan, N., <sup>3</sup>Karim, R. and <sup>4</sup>Rosita, J.

<sup>1</sup>Department of Food Service and Management, <sup>2</sup>Department of Food Science,

<sup>3</sup>Department of Food Technology, Faculty of Food Science and Technology, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

<sup>4</sup>Department of Nutrition and Dietetics, Faculty of Food Medicine and Health Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

**Abstract:** This study aimed to analyze consumers' perceptions and acceptance toward 'belacan'. Results showed internal reliability of above 0.7 for sections analyzed. Factor analysis found two underlying factors in the section designed to examine consumers' perceptions. The overall consumers' perception had a positive and moderate correlation with their acceptance and was significant at .01. Results also showed that 'belacan' consumption level was relatively frequent and well accepted by all races in Malaysia. The findings of the study would be noteworthy to the fishery industry and the small and medium industry (SME) in Malaysia in meeting consumers' needs.

**Keywords:** shrimp paste, 'belacan', Malaysian dishes, perceptions, acceptance, consumer study

---

### Introduction

Shrimp paste or 'belacan' as it is called in Bahasa Malaysia is a popular food ingredient in Malaysia. It is made from fresh tiny shrimps known as 'geragau'. Traditionally, 'belacan' is used as a food enhancer in countless Malaysian dishes. In addition it could also be mixed with chilies, lime and some other ingredients as a dipping condiment known as 'sambal belacan' that is well liked by Malaysians.

'Belacan' is commonly sold in dried blocks that range in color from pink to dark brown. Generally, belacan is roasted prior to usage, either wrapped in foil and dry-roasted in a wok, toasted over a gas flame on the back of a spoon or by using a fork. This is to enhance the flavor as well as killing bacteria (Hutton, 2005). The innocuous aroma from the roasted 'belacan' mixture is not so appealing to most westerners who are not used to 'belacan', but it is an absolute delight to most Malaysians.

To some people, food without 'belacan' is regarded as tasteless. With the addition of 'belacan', it will make the food more flavorful and appetizing as 'belacan' is perceived to contain a special taste that can make a dish more palatable and delicious. Thus

it has become an essential ingredient in curries and dipping sauces for a more appealing taste.

The cuisine of a country generally reflects the culture and other aspects of the nation. Malaysian cuisine reflects the multi racial aspects of the country. Malaysians vary widely in their food preferences, and it is almost impossible to make generalizations on what they eat. However, the ingredients used in cooking are mostly similar among the cultures. Thus, as time goes by, the food culture of each ethnic group was blended together to form a unique Malaysian cuisine (Hutton, 2005). 'Belacan' is one of the ingredients that are shared by different races in the culinary culture of Malaysia. 'Belacan' is used in a variety of local dishes such as chilli 'belacan' (*sambal belacan*), spicy noodle soup (*laksa*), fried rice with 'belacan' (*nasi goreng belacan*), fried chili paste (*sambal tumis*), chili and tamarind flavored dish with 'belacan' (*asam pedas*), stir fried water convolous with 'belacan' (*kangkung goreng belacan*), Indian fried noodles and so forth (Lee, 2001; Hutton, 2003; Hutton, 2005).

'Belacan' is an edible commercial semi-finished food ingredient. However, it could not be eaten directly, but normally added as a flavoring ingredient

---

\*Corresponding author.

Email: shahrimkarim2@gmail.com

Tel: +603 89468409; Fax: +603 89423552

to dishes. Several states in the country such as Melaka, Penang, Sarawak, and Perlis are well known for their 'belacan' among the Malaysian consumers. Nevertheless, the characteristic of belacan from these states varies in terms of their appearance, colour, texture, taste and aroma.

In Asia, 'belacan' varies in appearance from pale liquid sauces to solid dark brown colored blocks. It can be found in cube, block, round cake or powder form in the local markets. The Philippines 'belacan' is made by mixing salt and shrimp together using a ratio of 3:1 and the mixture is fermented for 10 days at a temperature of 28 - 30°C (Peralta *et al.*, 2005). The color of the 'belacan' in Thailand varies from dark purplish to grayish brown and from soft and pasty to dry and hard, depending on how long the fermented pulp was dried in the sun.

The production begins as soon as the shrimps arrived at the seashore. There are various methods of processing 'belacan'. One of the methods will be explained here. First, the shrimps are mixed with salt and immediately dried under the sun for half a day or one whole day. The semi-dried salted shrimps are pounded; at this point the paste mixture is placed in a tightly sealed container and kept for seven days at room temperature to allow fermentation to take place. The fermented shrimp paste will be dried, mashed and kept for several days until a desired textured is achieved. Finally, the paste will be formed into different shapes and sizes (Adnan, 1984).

Adnan (1984) recommended that a high quality 'belacan' should consist about 50% moisture content and between 13 to 17% of salt. However, if the moisture content is too low, the 'belacan' that is produced will be very dry and hard. If the 'belacan' is fermented for a longer period, the 'belacan' will have a strong aroma. The best 'belacan' with a nice aroma will be produced after one or two weeks of fermentation period.

The nutritional composition of 'belacan' varies. The protein content of 'belacan' was found to be high, approximately around 28-40%. This value was found to be higher as compared to the protein in meat (25-32%), fish (25-29%), milk (9-10%) and peas (5-8%) (Adnan, 1984). On the other hand, Peralta *et al.* (2005) discovered that the fermented 'belacan' contained anti-oxidative substances. In addition, they also confirmed that there was a significant large amount of polyunsaturated fatty acids (PUFA) and free amino acids. Thus this implies that the anti-oxidative substances in the fermented 'belacan' can prevent the PUFA from undesirable lipid peroxidation. Peralta *et al.* (2005) also stressed that the salt-fermented 'belacan' will serve as an effective antioxidant in the human body when included into human's

daily diet. 'Belacan' can also be a good source of eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA) and a number of essential amino acids to human.

Previous works on 'belacan' had focused heavily on the process of making 'belacan', microbial concern and its nutritional values. In due course, this study was done to fill in the gap from the consumer research perspective about 'belacan'.

In view of the fact that 'belacan' is one of the most popular ingredients in numerous Malaysian dishes, plus its nutritional values which was claimed by previous study; this study was carried out to analyze consumers' perceptions and their acceptance toward 'belacan'. As this was an exploratory study, hypotheses were not developed but were guided by research questions (RQ) as follows:

RQ1: What are the underlying factors that determine consumers' perceptions toward 'belacan'?

RQ2: Is there any relationship between consumers' perceptions toward 'belacan' and consumers' acceptance toward 'belacan'?

## Methodology

An exploratory research design was adopted in this study by utilizing quantitative techniques for data collection. The questions were developed according to the aim and boundaries set by the involved organization and researchers. There were four sections designed in the survey questionnaire as follows: 1) consumers' awareness and consumption; 2) perception towards 'belacan'; 3) acceptance of 'belacan'; and 4) demographic profile. The survey questions were pilot tested with a sample of respondents in Klang Valley area. Sample size was set at 200 as the main aim of the study was directed to explore the underlying factors. Hair *et al.* (2005) recommended that the minimum absolute sample size should be 50 observations but more appropriate to have at least 10 observations per variable.

Six major shopping malls were identified based on their locations within the municipality of Klang Valley. Data collection was extended over a period of twelve days where two days were allocated for each shopping mall. A team of five interviewers undertook the task of collecting data for an average of eight hours per day. Time was a constraint factor for this study thus the questionnaires were distributed through judgmental sampling among shoppers in Selangor. The shoppers were screened before they were recruited as respondents for the study. Only shoppers who claimed that they consumed 'belacan' were included in the sample. The questionnaires

took approximately 10-15 minutes to be answered. Respondents who completed the questionnaire were given a small token of appreciation.

#### Data analysis

A reliability analysis was used to measure the internal consistency of each of the research instrument's items. The Cronbach's alpha exceeded the recommended value by Hair *et al.* (2005); a generally accepted lower limit value for exploratory research is .60. For analyses purpose, descriptive statistics were used to present the data such as demographic profile. Factor analyses were used to determine the underlying factors in the construct and correlation

among the factors. The adequacy of applying factor analysis was determined by the measures of sampling adequacy (MSA) and Bartlett's test of sphericity.

#### Results and Discussion

A total of 176 completed questionnaires were obtained and used in this study. This figure accounted for a valid response rate of 88%. The characteristics of the sample are presented in Table 1.

Majority of the respondents had a monthly income of below RM1000 because majority of the respondents were in the category of students (59.1%).

**Table 1.** Respondents' demographic profile

Details	Frequency	Percentage (%)
Gender		
Male	60	34.1
Female	116	65.9
Total	176	100.0
Age		
20-24	105	59.7
25-29	46	26.1
30-34	9	5.1
35-39	4	2.3
40-44	2	1.1
45-49	5	2.8
50 and above	5	2.8
Total	176	100.0
Race		
Malay	111	63.1
Chinese	45	25.6
Indian	17	9.7
Others	3	1.7
Total	176	100.0
Level of education		
No formal education	2	1.1
Primary school	3	1.7
Secondary school	39	22.2
Diploma / certificate	57	32.4
Bachelor degree	60	34.1
Master & PhD	15	8.5
Total	176	100.0
Occupation		
Not working	9	5.1
Student	104	59.1
Clerical	8	4.5
Management / business	11	6.3
Professional	19	10.8
Self-employed	6	3.4
Home make / housewife	4	2.3
Others	15	8.5
Total	176	100.0

**Table 2.** Mean scores and Cronbach's Alpha coefficient

Attribute	Mean Score	Cronbach's Alpha
<b>Variable 1: Perceptions toward 'belacan'</b>		
'Belacan' makes food tastier	3.97	<b>.704</b>
'Belacan' could cause allergy to certain people	3.92	
'Belacan' is commonly used in Malaysian dishes	3.84	
'Belacan' taste depends on the method used in processing it	3.77	
'Belacan' is a common ingredient among all races in Malaysia	3.76	
'Belacan' could increases appetite	3.72	
<b>Variable 2: Acceptance of 'belacan'</b>		
I like the taste of dishes with 'belacan'	3.67	<b>.752</b>
I regularly consume dishes with 'belacan'	3.10	
I like the smell of 'belacan'	3.01	

1 - strongly disagree; 5 – strongly agree

The second highest category was professional (10.8%) and followed by other professions (8.5%).

Table 2 depicts the means scores and Cronbach's alpha coefficient values for Variable 1 (respondents' perceptions toward 'belacan') and Variable 2 (respondents acceptance of 'belacan'). All attributes used to measure Variable 1 had mean score above the midpoint scale. 'Belacan' makes food tastier had the highest mean score (3.97) among all. This was followed by 'belacan' causes allergy if eaten too much (3.92); 'belacan' is used in Malaysian cooking (3.84); 'belacan' taste depends on processing methods used (3.77); 'belacan' is common among all races (3.76); and 'belacan' increases appetite (3.72).

Variable 2, respondents' acceptance of 'belacan', consisted of three attributes. More than 50% of the respondents had very positive acceptance of 'belacan' taste in dishes, the mean score calculated was 3.67 which was relatively high. The mean score for the statement 'I regularly consume dishes with 'belacan'' was 3.10. This value was close to the midpoint (3) of the scale because nearly half of the respondents answered they neither agree nor disagree with this statement. However, there was a slightly higher percentage (33.5%) of respondents with favorable answers to this statement as compared to those who did not agree (25.0%). For the third statement, 'I like the smell of 'belacan'', the mean score was 3.01. There were 30.2% of respondents who agreed with this statement while a slightly lower percentage (27.8%) of respondents did not agree. Majority of the respondents were neutral to this statement.

Reliability analysis was conducted to determine

the internal reliability of the attributes in these two variables. The Cronbach's alpha coefficients of both variables were above .70 which indicated the internal reliability among the attributes in the variables was acceptable (Hair *et al.*, 2005).

Table 3 and 4 illustrate the results for factor analysis which used the principal components analysis and varimax rotation method. The basis for the number of factors to be extracted were eigenvalue, percentage of variance, significance of factor loading and assessment of structure (Kivela and Crotts, 2006). Eigenvalues equal to or greater than one were considered significant and others were ignored. As shown in Table 3, only 2 factors extracted had eigenvalue above or equal 1. The total cumulative variance accounted for this solution is 59% where Factor 1 contributed 32.8% and Factor 2 is 26.2%.

The criterion for including a variable under a factor is by examining the factor loadings of each variable. Only variables with factor loading equal to or greater than .5 (Hair *et. al.*, 2005) were considered. Bartlett's Test of Sphericity showed a value of 189.70 and was statistically significant at .05. This indicated that sufficient correlations exist among the variables to proceed. The Kaiser-Meyer-Olkin overall MSA was .735 which indicated that factor analysis was appropriate for the sample. Table 4 shows the result for the rotated component matrix. Four items fall under Factor 1 and two items fall under Factor 2; all items had factor loadings above .50.

The communality of each variable was relatively high, ranging from .399 to .823, which also specified that the variance of the original values was well

**Table 3.** Total variance explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.485	41.411	41.411	2.485	41.411	41.411	1.965	32.742	32.742
2	1.053	17.550	58.961	1.053	17.550	58.961	1.573	26.218	58.961

Note\* Extraction method: Principal component analysis

**Table 4.** Rotated component matrix<sup>a</sup>

1	'Belacan' increases appetite	.707	1
2	'Belacan' taste depends on the method used in processing it	.707	
3	'Belacan' makes food tastier	.644	
4	'Belacan' could cause allergy to certain people	.632	
5	'Belacan' is a common ingredient among all races in Malaysia	.906	2
6	'Belacan' is commonly used in Malaysian dishes	.739	

Note\* Extraction method: principal component analysis; rotation method: varimax with Kaiser normalization.

a. Rotation converged in 3 iterations.

explained by the two factors. Factor 1 was labeled as 'belacan' characteristics and Factor 2 was labeled as 'belacan' usage.

**Table 5.** Correlations between factor scores and 'belacan' acceptance

Dimension	Spearman rho correlation
Overall perceptions	.475**
'Belacan' characteristics (factor 1)	.473**
'Belacan' usage (factor 2)	.279**

Note: \*\*Correlation is significant at the 0.01 level (2-tailed).

Table 5 shows the result for a Spearman rho correlation on the factors. The correlation coefficient between respondents' overall perceptions and acceptance was .475 which signaled a positive and moderate correlation between the variables. This indicated that there was a significant relationship between respondents' perceptions and acceptance toward 'belacan'.

The correlation coefficient between Factor 1 and acceptance; and Factor 2 and acceptance respectively were .473 and .279. This showed that

Factor 1 ('belacan' characteristics) and respondents' acceptance toward 'belacan' had a positive and moderate relationship. Alternatively, Factor 2 ('belacan' usage) and respondents' acceptance toward 'belacan' had a positive and low correlation. All relationships were significant at .01 level examined at 1-tailed.

Respondents' consumption pattern is illustrated in Figure 1. All of the respondents were familiar with 'belacan' and consumed dishes with 'belacan'. Majority of the respondents (34.1%) consumed dishes with 'belacan' 2 to 3 times in a week while 26.7% said that they consumed 'belacan' dishes 2 to 3 times in a month. From the findings, it was found that 'belacan' was relatively favorable to majority of the respondents as more than 40% of the respondents consumed dishes with 'belacan' more than 2-3 times in a week.

Figure 2 shows the types of dishes selected to be respondents' favorite dishes. According to the results, majority of the respondents selected 'sambal belacan' (38.60%) as their favorite dish. This was followed by 'kangkung belacan' (15.90%); 'belacan' fried rice (10.20%) and 'sambal tumis' contributed 4.60%. Only 14.80% of respondents answered other types of dishes that they preferred. Those dishes were not listed in the pie chart because each dish was mentioned for a relatively low percentage which was not very significant. Some of the dishes mentioned

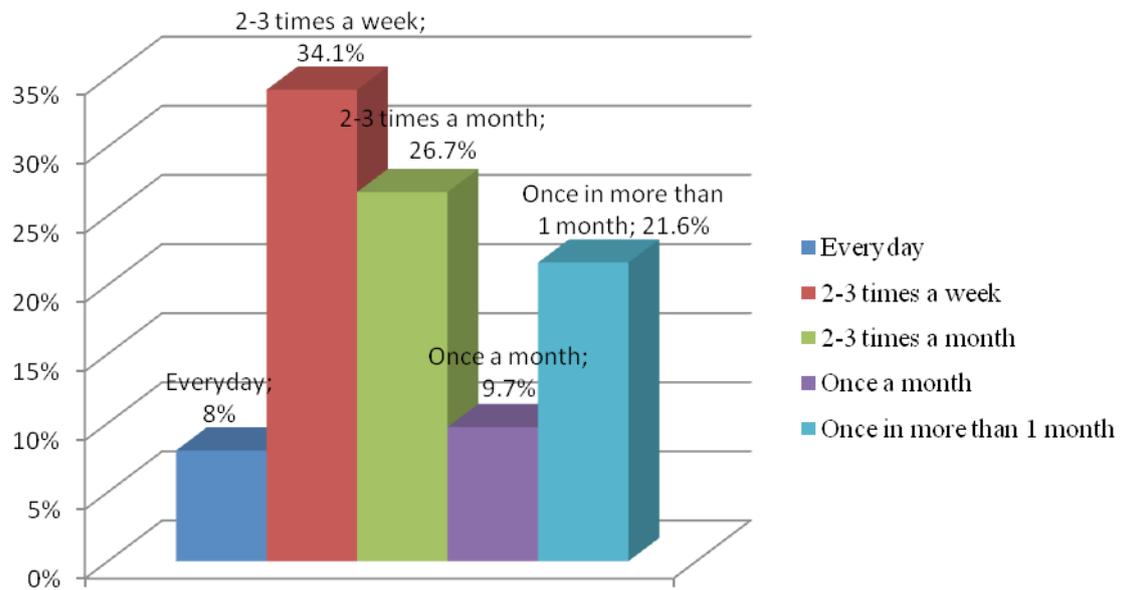


Figure 1. Consumption of dishes with 'Belacan'

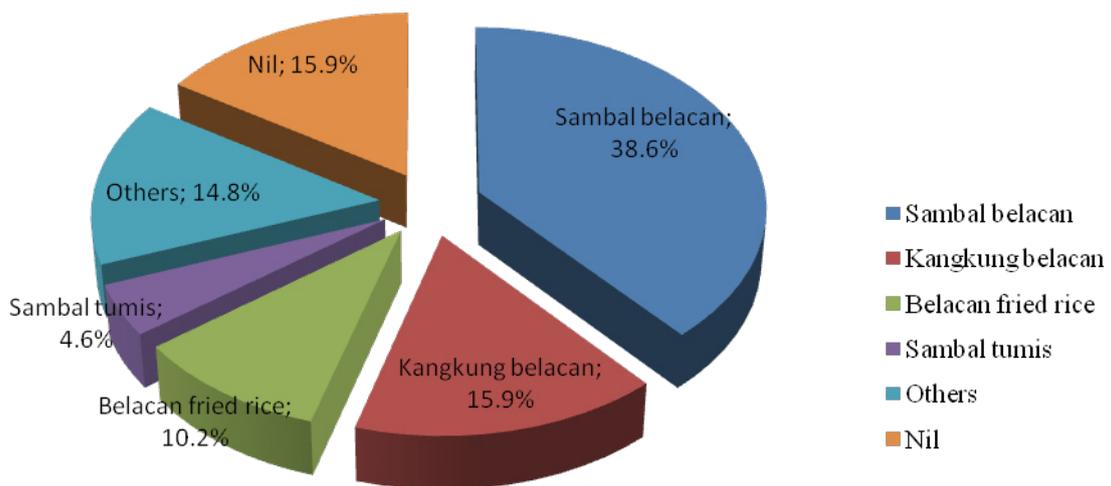


Figure 2. Favorite dish with 'Belacan'

which is categorized under 'others' were 'air asam', 'asam pedas', 'curry', 'laksa', 'rojak' and so forth. On the other hand, out of the 176 respondents, 15.90% did not answer this question which meant that they did not have any particular highly favored 'belacan' dishes.

## Conclusions

This research was conducted to determine consumers' perceptions and acceptance in relation to 'belacan'. From the results, it was clearly identified that there was a positive perceptions among the respondents toward 'belacan'. This was due to all respondents consumed dishes with 'belacan'. Additionally, the frequency of respondents consuming dishes with 'belacan' was relatively regular as majority alleged that they consume dishes with 'belacan' up to 2-3 times in a week.

Factor analysis revealed two underlying factors which were labeled as 'belacan' characteristics (Factor 1) and 'belacan' usage (Factor 2). Both factors were correlated with consumers' acceptance of 'belacan' using Spearman rho correlation. It was found that Factor 1 was positively and moderately correlated with consumers' acceptance whereas, Factor 2 had a positive but low relationship with the consumers' acceptance. This indicated that Factor 1 had more contribution as compared to Factor 2 in the relationship with consumers' acceptance as compared to Factor 2.

Respondents surveyed in this study have been consuming 'belacan' in the past. The frequency of their consumption depended highly on the liking of each individual. Additionally, perception toward 'belacan' is a crucial factor that could influence consumers' consumption pattern. In this study, majority of the respondents had favorable perceptions towards 'belacan'. It was found that the consumption frequency among the respondents were relatively high as more than 50% of the respondents consumed dishes with 'belacan' more than once in a month.

This study has several limitations that should be pointed out; consumers' perceptions and acceptance of food products are conditioned by more variables than the ones dealt with in this study (among others, information sources employed, level of experience, social groups, demographics and socio-economic characteristics, lifestyles). On the other hand, the result generated is only applicable to the samples studied, as a non-probability sampling method was applied in the methodology. Per se, future research is recommended to employ a probability sampling method so that the derived results would better represent the population studied.

To add to the body of knowledge, it is suggested that future research should be directed to other variables that were not examined in this research. In addition, future research should seek to explore the supply and demand market as well as the marketing strategy that could be used in enhancing 'belacan' consumption. Alternatively, future research should be conducted from the product innovation and development perspective where extension product from 'belacan' could be studied. For example, conventional 'belacan' products could be enhanced with a blend of other seafood products or vegetable based paste to increase the variety of consumers' goods.

The result has important corollary for 'belacan' producers such as the fishery industry or the small and medium enterprises (SME's). The industry has to consider about the creation, maintenance or change of attitudes of potential customers toward 'belacan' as the findings provide information on consumers' perceptions and acceptance of 'belacan'. Overall, 'belacan' has a major role in enhancing the taste of Malaysian food and it is an important ingredient in Malaysia cuisine and it is well accepted by all races in the country.

## References

- Adnan, N. A. 1984. Belacan-Kaedah penyediaan dan kawalan, *Teknologi Makanan*, Jil.3, Bil. 1, pp. 5-8, April,1984.
- Ang, C., Liu, K. and Huang, Y. 1999. *Asian Foods, Science and Technology*, Technomic Publishing Company, Inc.
- Lee, C. H., Steinkraus, K. H. and Reilly, P. J. A. 1993. *Fish Fermentation Technology*, United Nations University
- Field, A. 2005. *Discovering Statistics Using SPSS*, 2<sup>nd</sup> Ed, SAGE Publications.
- Hair, J., Anderson, R., Tatham, R. and Black, W. 2005. *Multivariate data analysis* (6<sup>th</sup> Ed.). New Jersey: Prentice Hall.
- Hutton, W. 2003. *Malaysian favourites*, Periplus Editions (HK) Ltd.
- Hutton, W. 2005. *Authentic Recipes from Malaysia*, Periplus Edition (HK) Ltd.
- Kivela, J. and Crofts, J. 2006. Tourism and gastronomy: gastronomy's influence on how tourists experience a destination. *Journal of Hospitality and Tourism Research* 30(3): 354-377.
- Lee, G. B. 2001. *Nonya favourites*, Periplus Editions (HK) Ltd.
- Peralta, E. M., Hatate, H., Watanabe, D., Kawabe, D., Murata, H., Hama, Y. and Tanaka, R. 2005. Antioxidative activity of Philippine salt-fermented shrimp and variation of its constituents during fermentation. *Journal of Oleo Science* 54: 553-558.