

Thai consumer valuation of food safety labels on fresh produce

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ABSTRACT

Food Safety has been concerned as a prominent issue in Thailand for a decade. Food Safety labels (e.g., Q mark from the Ministry of Agriculture and Cooperative) have been introduced to the market in order to assist consumers to recognize safe products, particularly fresh produce that is the main concern of Thai consumers. However, there is no clear evidence on the value Thai consumers place on the labels and this is reflected in the reluctance of the fresh produce industry and particularly producers to comply with regulations to obtain certification and label. This contributes to hinder the development of a market for safe fresh produce. It could also be a key constraint for the Thai government in its effort to present Thailand as “Thai Cuisine to the World” and for the industry to compete in the ASEAN Economic Community in 2015. This study is aimed at estimating the value Thai consumers place on food safety labels for fresh produce using a discrete choice experiment. The primary data has been collected through a survey aimed at eliciting consumers preferences and willingness to pay (WTP) for Chinese cabbage, trading off between different types of food safety labels and private brands, price, and freshness. A sample of 350 Thai consumers took part in the survey administered at different locations in Bangkok and vicinity in July 2013. Multinomial Logistic Regression (MNL) was used to analyse the data. Results suggest that consumers value quality labels (i.e., Q mark, Royal Project brand plus Q mark, and Doctor's Vegetable plus Q mark). Freshness, brand and label, and price are all considered as relevant attributes by consumers. We conclude discussing the implications of our findings for businesses and policy makers.

Keywords

Thai consumers, Food Safety label, Discrete Choice Modelling, MNL, Chinese cabbage

INTRODUCTION

Food safety scares (such as, mad cow disease, dioxins, avian flu, melamine contamination and *Escherichia coli* outbreaks) have raised awareness about food safety issues among consumers. The series of food scandals not only deteriorate consumers' confidence on food safety, but also threaten sustainability of food industry and trades. Usually, when consumers learn of a food safety incident and the possibility that certain food is unsafe, they might simply stop consuming that type of food; hence, the specific food sector is heavily damaged (Mazzocchi et al. 2008). Food safety standards and labels are one of the tools used by several governments and firms to cope with food safety issues in the supply chain (e.g. Caswell 1998; Golan et al. 2004; Henson and Humphrey 2009; Hammoudi et al.

2010). In Thailand, however, most of standards and regulations are weakly enforced in the domestic market comparing to exported products, which are more strictly controlled by importer regulations and voluntary private standards (e.g. Global GAP in the EU) (Oates 2006; Takeuchi and Boonprab 2006). Food safety scandals still remains a prominent issues in domestic markets, for instance scandals related to chemical residues on some fresh produce (e.g. Chinese Kale and chilli), outbreak of *Clostridium botulinum* contamination in home-canned bamboos shoots. As a result, Thai consumers have increased awareness on the importance of food safety controls and some of them are now more demanding when it deals with quality and safety of food products, especially in the urban area (e.g. Posri et al. 2006; Takeuchi and Boonprab 2006; Roitner-Schobesberger et al. 2008; Lippe 2010; Lippe et al. 2010).

In order to meet consumer demand and to increase the level of food safety assurance provided by the market, the Thai government tried to strengthen the regulation in the domestic market and to introduce a voluntary standard and the related food safety label in the market. In 2004, the government enacted a food safety policy named 'From-Farm-To-Table' or 'From-Farm-To-Forks' aimed at ensuring food safety monitoring and control system throughout the food chain [The National Bureau of Agricultural Commodities and Food Standard (ACFS 2011)]. Subsequently, in 2005, ACFS established a voluntary food safety label named "Q mark"¹ as an attempt to reach food safety goals, to encourage competition in product markets, and to provide information to assist consumers in recognising safe products, particularly fresh produce that is the main concern of Thai consumers (Vanit 2006; Lippe 2010). Currently, Q mark is one of the dominant food safety labels for fresh produce in the Thai market.

Q mark products, however, have been distributed mainly through supermarket chains, while most of Thai consumers still buy fresh produce at fresh markets. So, a majority of consumers are not aware of or understand the meaning of this label. Hence, the fresh produce industry and particularly producers hesitate to comply with regulations to obtain this certification and label, because they are uncertain on whether they will obtain the premium price to compensate the investment needed to comply with the standards. This contributes to hinder the development of a market for safe fresh produce. It could also be a key constraint for the Thai government in its effort to present Thailand as "Thai Cuisine to the World"² and for the industry to compete in the ASEAN Economic Community in 2015.

So as to facilitate the food safety label policy, consumers' preferences and willingness to pay (WTP) for food safety label should be investigated. Thus, the social desirability for food safety label could be revealed for policy decision making. Furthermore, the study on consumers' preferences and WTP for different attributes of fresh produce (e.g. price, freshness, brand and label) is important for stakeholders (i.e. producers and firms) to be taken into account when they make a decision on production or marketing activities. For instance, which production system and certification schemes to apply?, or which is the market segment?, which marketing tools should be used to promote the products? and what are reasonable prices to charge?

To the best of researcher's knowledge, the literature regarding this topic in Thailand is sparse. This study is aimed at filling this gap by estimating the value Thai consumers place on food safety labels for fresh produce using a discrete choice experiment. Chinese cabbage is a representative product because it is a common fresh vegetable that Thais consume both raw and cooked on a regular basis, besides, it is the vegetable that Thai consumers are moderately concern about because of chemical residues, therefore, they might look for the guarantee of food safety before making a

¹ According to TACFS 9005-2548 (2005), section 4, in order to use Q mark, the primary production processes at farm level has to be in accordance with the requirements of national GAP (Good Agricultural Practices) standards and be certified by the certification body (CB); the production process and post-harvest activities (e.g. pack house facilities) has to conform to GMP (Good Manufacturing Practices) or HACCP (Hazard Analysis and Critical Control Points) and must be certified by the CB; the operators must observe procedures for tracing products and complying with traceability requirement; and products using Q mark will be tested for quality and safety.

² The Thai government's policy to promote Thailand to be the Kitchen of the World. It aims to promote the Thai food to be one of the favorite food recipes all over the world, including export of raw materials and additional ingredients for Thai recipes with the highest creditability in safety, health and sanitation (<http://www.thaifoodtoworld.com>)

decision. Q mark is the main interested food safety label while claimed³ “Safe Produce (ผักปลอดภัย)” and private brands (i.e. Royal Project “โครงการหลวง” and Doctor's Vegetables “ผักดีอกเดอริ”) are included in this study due to their existence and importance as brand and label related to food safety in the market. Finally we discussed the possible suggestion for policy makers and the industry.

CHOICE EXPERIMENT TO ELICIT CONSUMERS' WTP

There are several techniques that could be employed to measure WTP. The choice experiment is one of the techniques that has been most used to elicit WTP of consumers for certain food attributes (e.g. Burton et al. 2001; Alfnes 2004; Rozan et al. 2004; Loureiro and Umberger 2007), particularly in situations where market data are non-existent or unreliable (Tonsor et al. 2009). In a choice experiment, respondents are asked to choose their preferred alternative amongst hypothetically constructed scenarios, where each scenario is a function of different attributes of product (including price) and each attribute varies at different levels. By observing the changes in respondent stated choices with variation in the scenarios, the effect of the attributes on the choices can be derived. The advantage of choice experiment is that it allows the researchers to combine different product attributes that may or may not already exist in the market and force respondents to trade off one attribute against another (James and Burton 2003). Nevertheless, a main concern when using this technique is the potential presence of hypothetical bias⁴ (Neill et al. 1994), a problem that is common to all the WTP elicitation techniques that rely upon stated preferences and that could be limited by using cheap talk⁵ before the experiment (Silva et al. 2011).

A number of studies have attempted to examine consumers valuation for food labels using choice experiments. For instance, Caputo et al. (2013) estimated WTP of food miles labels on cherry tomato, plum tomato, beefsteak tomato and concluded that Italian consumers are willing to pay a price premium for food miles labels. Sackett et al. (2012) studied US consumers WTP for sustainable produced steak and apples and found that the consumers have positive WTP for local, sustainable, and organic labels. Lippe et al. (2010) evaluated the preferences and WTP of consumers in Thai urban areas (Bangkok and Chiang Mai) for pesticide-safe cabbage and concluded that Thai consumers in urban areas are willing to pay higher prices for safety labelled fresh fruit and vegetables.

METHODS

The data used in this study are drawn from a survey administered to a sample of Thai consumers during July 2013 in Bangkok and Nonthaburi, Thailand. Quota sampling according to the shopping outlets and convenience sampling methods were adopted to reach the target number of respondents (350). Fifty seven percent of the respondents (200 persons) were recruited at the fresh markets and the rest (150 persons) were recruited at the supermarkets because Thai consumers still buy fresh vegetables mainly from fresh markets (Lippe et al. 2010). The questionnaire was administered face-to-face by trained interviewers in two fresh markets ("Yingchareon Market" and "ATK") and three supermarkets (The Mall, Ngamwongwan", "TOPs market, Kaset" and "Tesco Lotus, Bangsue") on the weekdays and weekends and at different times of the day to cover a wide range of consumer types. Interviewers stayed nearby the fresh fruits and vegetables shelves and asked consumers to participate the survey on a voluntary basis. Before the interview starts, interviewers asked three screening questions related to: whether they aged above 18 years old; whether they were the main household food shoppers; and whether they consumed vegetables and cabbages. If the respondents said yes to all questions, the interview started; otherwise interviewers drop the respondent. The interviews were conducted in Thai language and its duration ranged 10-15 minutes.

Questionnaire comprised 4 parts: (1) dietary habits and consumption patterns; (2) choice experiment; (3) knowledge and attitudes of food safety and food safety label; and (4) household

³ It is only a 'claim' without the guarantee or inspection from the government authorities or third parties

⁴ Respondents might overstate WTP in the hypothetical situation due to the lack of incentive to state the real amount.

⁵ Script explains the problem of hypothetical bias to participants prior to administration of a hypothetical question. The premise behind this technique is that one might be able to reduce or eliminate by simply making respondents aware of it regardless of its underlying cause.

characteristics. The questions take closed-form and multiple choices. In the attitude section, respondents were asked to give their opinion toward statements according to the 5-point Likert scale, from 1 (Strongly disagree) to 5 (Strongly agree). For choice experiment part, respondents were presented with a set of 12 simulated choice shopping tasks and they were asked to choose a preferred alternative from two Chinese cabbages and a no purchase option. Each of the cabbage products was described and presented to respondents in terms of three attributes (price, freshness, and brand & label) at different levels. Table 1 shows the attributes and attribute levels evaluated in the choice experiments. As mentioned earlier, we considered 4 types of brand & label: “Q mark”, which is the main food safety label in the market; label claims “Safe Produce” (“ผักปลอดภัย”) which is widespread throughout the market; and two private brands “Royal Project” and “Doctor's Vegetables”, which are among the most well-known fresh produce brands in the market and are considered as high quality and safety brands. Note that most products from these private brands obtained Q mark; thus, Q mark always appeared together with them in this experiment.

Prior to the choice experimental part, respondents were informed that the cabbage products presented to them differ only in terms of the three attributes described, and that all other attributes are identical. They were also informed about the meaning of each considered attributes. The choice situations were presented by using pictures and clear labelling to aid respondents' understanding (see example in Figure 1). The choice questions were presented in randomized order across respondents to mitigate any ordering biases (Loureiro and Umberger 2007). We included also a “Cheap Talk” script to be presented to the respondents right before the choice question to minimise the potential hypothetical bias in the responses.

Descriptive statistics analysis was used to describe Thai consumers' features in terms of socio-demographics, consumption habits and perception toward food safety and label. Mann-Whitney U tests (Mann and Whitney 1947) were employed to compare features and attitudes between consumers' groups (fresh market and supermarket). The choice experiment data was analysed using a random utility framework (Marschak 1960). The multinomial logit model (MNL) for main effects was applied to analysed data using the package *mlogit* (Croissant 2012) available in the statistical software R2.14.2 (R Core Team 2013). Willingness-to-pay (WTP) for each attribute levels of 'brand & label' attribute were calculated by dividing the differences between the coefficient of each brand & label attributes and coefficient of reference level (no information) by the coefficient of price.

RESULTS

Consumers' socio-demographic characteristics and consumption habits

A total of 350 respondents completed the survey and the selected demographic attributes are provided in Table 2. The majority of respondents were female (86%), as expected when targeting responsible of food shopping for Thai household. The average respondents are 43 years old. The majority of respondents have University Degree (58% of respondents), i.e. Bachelor, Master or Doctoral Degree. The average household income was between 40,000 to 54,999 baht/month. However, income levels of respondents are quite diversified, ranging from lower income level (e.g. 10,000 - 24,999 baht/month) to upper income level (more than 70,000 baht/month). More than 25% of respondents are categorised in the upper income level. Around 21% of respondents had children aged less than 8 years old at home and 23% of respondents had children between 9-15 years old at home. Comparing between respondents at fresh market and supermarket using Mann-Whitney U test, the age range ($z = -2.733$, $p = 0.006$), education ($z = -3.000$, $p = 0.003$) and frequency of fresh produce purchasing ($z = -3.243$, $p = 0.001$) are significantly different. Respondents at the fresh markets have higher average age range, lower average education level (high school) and higher frequency of purchasing (4 or more times per week).

We found that the respondents' characteristics are consistent with Bangkok census data in 2011 on average age (30-40 years old), average household income (48,951 baht/ month) and average highest level of education (high school). Nevertheless, the high proportion of higher education respondents might due to the fact that TOP supermarket (Kaset) is located nearby a University and several Government Offices; hence most of their customers have higher education. The high proportion of elder respondents might be because the elders had more time and tend to cooperate

more in surveys. Whilst the high numbers of respondents with a upper income level may be due to the fact that ATK is a high-end market, where quality products are sold at a high price.

Regarding fresh produce consumption habits, more than 67% of respondents purchased fresh produce at least 2-3 times per week. In addition, more than half of respondents had ever bought products with Q mark (61%) and Royal Project brand (79%) from time to time.

Consumers' perceptions toward food safety and food safety labels

Three hundred and forty seven respondents completed all the questions in this section. Most of respondents are neutral or agree with the statements. From the pooled sample, respondents agreed to the following statements: eating fresh produce is risky because of chemical residue or biological contamination; fresh vegetables with natural defects (e.g. hole from pest) are safer; I have confidence in the safety of products certified by the government agency; and I am willing to pay more for fresh vegetables with food safety label. Instead, they tend to be neutral to the following statements: the quality and safety of fresh vegetables has been improving in recent year more than 10 years ago; the higher price of fresh vegetables may indicates better quality and safety of the products; I have confidence in the safety of fresh vegetables sold at reputation stores; I have confidence in the safety of products certified by the private company, international organization and claimed "Safe Fresh Produce" label.

We made a comparison between respondents' groups using Mann-Whitney U test, and we found out that perceptions toward the statement "I consider fresh vegetables with natural defects safer than others" are significantly different ($z = -3.358$, $p = 0.001$). Consumers shopping at fresh markets have significantly higher mean (3.89) than consumers at supermarket (3.61). In other words, consumers at fresh markets thought that fresh vegetables with natural defects are safer than others. This means that consumers at fresh market use appearance as an indicator of food safety more than the ones shopping at supermarket.

The results indicate that respondents are not sure whether the quality and safety of fresh vegetables nowadays are better than before and they are aware of food safety risk from chemical residue or biological contaminations. This infers that there is a lack of confidence on fresh produce food safety in the market. For surveyed respondents, price is not an indicator of higher quality and safety. On the other hand, natural defects (product appearance) are used as an indicator of safe fresh vegetables. Regarding trust on certification bodies, it seems that respondents have more confidence on the government agency than others. Finally 70% of respondents say they are willing to pay more for food safety labelled vegetables.

Consumers' preferences & WTP for food safety label on Chinese cabbage

The parameter estimates of the MNL models are listed in Table 3 while Table 4 exhibits the marginal WTP values for the brand & label attributes. All coefficients of the model except Claimed "Safe Produce" label are significant at 1% significance level. This implies that attributes chosen in this research (freshness, price, and brand & label) are all considered as relevant attributes by consumers. The constants for the purchase of cabbage (options A and B) are positive and significant, meaning that consumers are willing to pay a price to purchase the product.

As expected, the coefficient for the price is negative indicating that an increase in price will decrease consumer's utility and lower the probability to buy. Regarding freshness attribute, cabbage that was harvested 2 days ago is less preferred by consumers, while produce harvested today and yesterday are similar in preference. With respect to brand & label attribute, the coefficients of "Q mark", "Royal Project & Q mark", and "Doctor's Vegetables & Q mark" attributes are significantly positive, suggesting that the utility for Chinese cabbage with these brands & labels will be higher than for the one without a label. The coefficient of Claimed "Safe Produce" label is not significantly different from the overall average implying that consumers give value to this label more than no information but less than the other labels. However, all coefficients of parameters in brand & label attribute (except claimed label) are not significantly different between them, implying that consumers do prefer to have a brand or label over nothing and over claimed label, but they do not care too much about which label is presented.

With regards to our findings on brand & label information, consumers are willing to pay large premium for branded & labelled cabbages relative to cabbage without information. This means that products with Q mark, Royal Project & Q mark and Doctor's Vegetables & Q mark are strongly preferred and would certainly gain a premium in the market relative to cabbage without any information.

It should be noted that the values calculated from the models are the average maximum values that the consumers are willing to pay to obtain the cabbage for their utility, that is the threshold beyond which they would more likely decide to keep money in their pocket. It is not the advisable price to be set for the products with brand & label, because it is the level of premium that would make the consumer surplus equal to zero and might lower the probability that consumers will buy the product.

DISCUSSION AND CONCLUSIONS

We assessed Thai consumers' preferences and WTP for food safety labels and other relevant attributes of fresh Chinese cabbage using choice experiments. We found that freshness, price, and brand & label are all relevant attributes to Thai consumers. Freshness is the most significant attribute, followed by brand & label, and price. Conforming with previous studies (Lippe 2010), freshness is the most important attribute affecting Thai consumers decision to buy fresh produce. From the attitude part, we found that most consumers agreed or strongly agreed that fresh vegetables with natural defects (e.g., hole from pest) are safer than others. The reason that consumers relate physical appearance with safety of products might contribute to the fact that food safety and quality are not easy to identify at the sale point, therefore, consumers tend to rely upon extrinsic cues such as freshness, appearance, labels, certifications, and brand names in their purchasing decision (Verbeke 2005; De Jonge et al. 2007; van Rijswijk and Frewer 2008).

The results suggest that surveyed consumers are willing to pay a premium price for Q mark, Royal Project & Q mark, and Doctor's Vegetables & Q mark labelled products over unlabelled ones. They are also ready to pay a lower premium for Claimed "Safe Produce" label, showing their need to be reassured about food safety. This finding implies that when providing such information (food safety) with certain guarantees (by certification and/or brands or, at a lower degree, simply with a claim), consumers are better off (having higher utility). Thus, food safety labels based on a reliable and properly enforced quality assurance system would be socially desirable, since they could reduce asymmetric information between seller and buyer and reduce searching time and cost for consumers (Caswell 1998; Giannakas 2002; Jahn et al. 2005). The premium prices in this study indicate the perceived need to have safer food available on the market and social desirability to be informed by food safety label. In other words, Thai consumers have low confidence on food safety of fresh produce products in the market or have low trust on the mandatory regulation so that they search for an "extra" guarantee in term of certification or well-known brands (Henson and Northen 2000; De Jonge et al. 2007). Hence, if the government is not able to increase its investments in enhancing the overall food safety level, the food safety label policy should be supported and continued in order to improve the market of safe fresh produce products.

As a matter of fact, we found that consumers are willing to pay for any guaranteed brands and labels, so, for them, the brand & label does not matter, they prefer just to have an additional guarantee. Consumers' indifferent feeling toward brands and labels could bring benefits and drawbacks. The positive aspect is that there is room for food safety labels in the fresh produce market. Private sector could use food safety labels to signal to consumers that products are safe and trusted brands and labels could become a tool to differentiate products and to enhance the competitiveness in the high-value market (Henson and Reardon 2005). On the other hand, the need for reassurance may provide market incentives to fake or self-claimed labels as well, if consumers do not receive correct information or are not well-informed regarding the labels. It should be noted that surveyed consumers place a value on claimed label less than on the other labels because we informed them about the meaning of "claimed" label in advance. In the study, surveyed consumers were in the position to understand that claimed label does not possess any real guarantee in term of certification, but it was only based on trust in the claimer; however, they give some additional value to claimed safety

compared to no information. Apparently, information provision to consumers are vital for food safety label.

The results from attitude part indicates that Thai consumers perceive higher confidence and trust on government certification over private certifications; hence, Q mark could be the most promising food safety label in the market. However, the results from experimental part shows that there is no significant difference among government-led and well-known private brands suggesting that both government labels and private brands have chance in the market. Nevertheless, government agencies must play an important role in disseminating knowledge and information regarding food safety and food safety labels in order to mitigate the risk of consumer deception by fake or self-claimed labels.

For producers and private firms, our results suggest that there is a need for higher food safety level in the fresh produce supply chain. There is a potential market share for fresh produce products bearing food safety labels, so that they can be used to differentiate from competitors. Producers applying for foods safety certifications and labels should have a better chance to approach (especially large) retailers in the middle and high-end markets. This is confirmed by the fact that five large retail chains (Siam Makro, Central Food Retail, CP All, Tesco Lotus, and Big C) signed an agreement to support and distribute food products with ThaiGAP certifications (certification for good agricultural practices, which is one of the food safety certification applicable at farming level (Thai Post 2013).

Since the respondents in this study are mainly from the city of Bangkok and vicinity, the study findings cannot be generalized to Thailand as a whole. However, the results can serve as an input for a wider study to be extended in other areas of Thailand. An important limitation is that, although we chose to put brand & label attributes together the Q mark to be more realistic, this implies the drawback that with this design we cannot separate the effect of private brands (Royal Project and Doctor's Vegetables) from the effect of certification label (Q mark): we only know that the cumulated effect is not different from the effect of Q mark alone. In further research, brand attribute and label attribute could be separated in the experimental design in order to define the effect of each attributes on consumers' preferences. In this case, an interaction term between attributes and consumers' characteristics and/or consumption pattern should be included in the design. Consumers' perception toward food safety & label and its effect on consumers' preferences should be tested as well. Furthermore, the impact of information of brand & label on consumers' preferences should be tested to confirm our assumption regarding importance of information for food safety label policy.

As a final remark, we point out that our results suggest that food a safety label is beneficial for Thai consumers. Hence, the food safety label policy should be supported to reach food safety targets and to provide consumers with information and protection from deception. Information and trust are vital for the policy as they are the main component in the food market. Q mark is currently the most promising food safety label because it could be accessed by all small farmers and can be found in all markets; however, the improvement of the credibility of the system and the enforcement of the regulation are crucial and urgently required. The dissemination of information regarding food safety, certification and labels should be able to effectively reach consumers. Finally, food safety labels can be used as an incentive to promote safe production/consumption in accordance to the international trend. This would be necessary for Thailand in light of the strategy of positioning itself as "Thai Cuisine to the World".

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Table 1. Attributes and levels of fresh Chinese cabbages used in the choice experiment.

Product attribute	Attribute level
Price	25, 50 (average market price in June 2013), 75, 100 baht/kg
Freshness (day after harvest)	0 day (today), 1 day (yesterday), 2 days (2 days before)
Brand and Label	No information, Claimed "Safe Produce", Q mark, Royal Project & Q mark, Doctor's Vegetables & Q mark

Table 2. Socio-demographic characteristics and consumption behaviour of the sample.

Characteristics	Percent of total (%)		
	Wet market (N=200)	Supermarket (N=150)	Pooled sample (N=350)
<i>Gender</i>			
Female	87.00%	85.30%	86.30%
Male	13.00%	14.70%	13.70%
<i>Age (Mean, st.dev.)</i>	44.91 (14.530)	40.39 (15.421)	42.96 (15.067)
19-30 years	21.20%	32.00%	25.90%
31-40 years	16.70%	20.70%	18.40%
41-50 years	22.70%	18.70%	21.00%
51-60 years	24.20%	18.00%	21.60%
More than 60 years	15.20%	10.60%	13.10%
<i>Educational level (Median)</i>	4	4	4
1 = Less than middle school	18.00%	7.30%	13.40%
2 = Middle school	7.50%	3.30%	5.70%
3 = High school or equal	18.50%	18.00%	18.30%
4 = University degree	51.50%	68.00%	58.60%
5 = High Vocational Certificate	4.50%	3.40%	4.00%
<i>Average household income (Median)</i>	3	4	4
1 = Less than 10,000 baht/month	7.00%	4.00%	5.70%
2 = 10,000 - 24,999 baht/month	20.50%	22.70%	21.40%
3 = 25,000 - 39,999 baht/month	25.00%	14.70%	20.60%
4 = 40,000 - 54,999 baht/month	15.50%	16.00%	15.70%
5 = 55,000-69,999 baht/month	10.00%	12.00%	10.90%
6 = 70,000 baht/month or more	22.00%	30.60%	25.70%
<i>Having children < 8 years living with you</i>	24.00%	16.70%	20.90%
<i>Having children 9-15 years living with you</i>	25.50%	20.70%	23.40%
<i>Frequency of buying fresh produce (Median)</i>	4	4	4
1 = Once per month or less	2.50%	4.70%	3.40%
2 = 2-3 times per month	7.50%	10.00%	8.50%
3 = Once per week	18.50%	24.00%	20.90%
4 = 2-3 times per week	35.50%	42.70%	38.60%
5 = 4 or more times per week	36.00%	18.60%	28.60%
<i>Have ever bought Q mark products</i>	62.00%	60.70%	61.40%
<i>Have ever bought Royal Project brand products</i>	77.50%	80%	78.60%

Table 3. Estimated parameters for the multinomial logit model.

Coefficients	Estimates
Intercept (option A)	2.8221***
Intercept (option B)	2.6174***
PRICE	-0.02058***
FRESHNESS	
Today ^a	0.7277***
Yesterday	0.1761***
2 days ago	-0.9038***
BRAND & LABEL	
No information ^a	-1.2413***
Claimed "Safe Produce"	-0.0966
Q mark	0.4751***
Royal Project & Q mark	0.4206***
Doctor's Vegetables & Q mark	0.4421***
Number of respondents	350
Number of observation	4200
Log likelihood	-3086.5
χ^2	1824.6
McFadden R ²	0.2282

Note: *, ** and *** significant at the 0.10, 0.05, and 0.01 level, respectively

The results are from effect codes produced by R 2.14.2.

^a are the reference levels of the attributes, the coefficients was calculated by:
 coefficient (ref.lev.) = - Σ coefficients (attribute levels)

Table 4. WTP estimates for the multinomial logit model.

Attribute	WTP (baht/kg)
Q mark	83.38
Royal project & Q mark	80.74
Doctor's vegetables & Q mark	81.78

Note: No information (no brand & label) is a reference point

Which of the following three choices do you prefer for each choice set?



Option A	Option B	Option C
 <p>Freshness = today</p> <p>Claimed "Safe Fresh Produce" ("ผักปลอดสารพิษ")</p> <p>25 baht/kg</p>	 <p>Freshness = yesterday</p> <p>75 baht/kg</p>	Neither A or B
I choose ...		

Figure 1. An example choice scenario included in the choice experiment.