

# The Factors Affecting Decisions to Purchase Rice and Consumer Perception of Organic Rice in Bangkok, Thailand

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**Abstract**— The present research was aimed at studying the behavior and factors affecting decisions to purchase rice and awareness about organic rice in order to provide guidelines for organic rice entrepreneurs in meeting consumer demands. Data was collected randomly by E-survey (Google form), while field data was collected from 433 individuals in supermarkets and organic product exhibitions in urban Bangkok Metropolitan Area, Thailand.  $\chi^2$  test (at 5% level of significance) was used to test the differences between types of respondents, decisions to purchase rice, and awareness about organic rice. On the decision behavior in choosing rice, the study found that consumers generally prefer the same type of rice without changes (37%). The top consideration affecting decisions to purchase rice was flavor (46%), followed by nutritional value (30%). In addition, 230 samples (53.1%) were aware of organic rice. Among these, 52% supported organic rice due to health concern, and 16% favoured organic rice for environmental reason. Those without awareness of organic rice indicated that it was due to inadequate public information (77.8%). Further data are discussed in the article. This information is useful for providing knowledge on urban rice consumption and attitude in order to promote better understanding among rice producers/ traders in meeting consumer demand.

**Keywords**— Organic rice, consumer Survey, urban rice consumption

## I. INTRODUCTION

Rice is an important industrial crop with global significance because rice provides essential nutrients for the body such as carbohydrates, proteins, fat and dietary fiber while being rich in various vitamins and minerals. Hence, rice is a staple food for over half of the world's population, most of which are in Asia. Thailand is a top exporter and domestic consumer of rice. Due to awareness and interest about chemical contamination in rice production that harms the ecosystem and the environment along with the health of producers and consumers, organic rice cultivation has become an option for people who care for their health and the environment. This is because no agrochemicals [1] such as chemical fertilizer, growth regulators, herbicides and insecticides and fumigation chemicals are used in organic rice

cultivation. Organic rice cultivation is an agricultural production system that emphasizes natural resource conservation, natural abundance restoration, preservation of natural and environmental balance and appropriate use of natural resources [1]-[3]. Furthermore, organic rice cultivation can raise the prices of rice and create income for farmers while stimulating the nation's economy in the agricultural sector [3]. However, every type of production has to reach consumers and meet their demands. Therefore, the present research was aimed at studying the behavior and factors affecting rice purchase decisions and awareness about organic rice in order to provide guidelines for organic rice entrepreneurs in sustaining their business.

## II. LITERATURE REVIEWS

### A. Organic Rice in Thailand

Surveys conducted by the Earth Net Foundation and the Green Net Cooperative found that organic farming in 2016 had increased substantially compared to 2015 with an increase of up to 21 percent. The majority of the aforementioned growth occurred in the organic rice sector (28%) and integrated farming (187%) [4], while policy and market factors of the government on abolishing the rice subsidy policies in early 2014 had lowered the prices for ordinary un-milled rice and increased the price of organic rice to about ten percent above ordinary un-milled rice. However, packaged organic rice sold in Thailand is approximately 20 percent more expensive than ordinary rice [5], which is another factor for more farmers to switch to organic rice farming.

In any case, organic rice farming continues to have numerous limitations. The Department of International Economic Affairs [6] has compiled the aforementioned limitations as follows: 1. farmer's preparations. In order for farmers to switch from industrial or agrochemical farming to organic farming and to meet international standards, the farmers have to strictly adhere to practice regulations, particularly for export production which requires certification. This creates a heavy burden for farmers because standards have specified that farmers refrain from production for a span of at least two to five years between agrochemical and organic farming. Consequently, farmers have to make preparations beforehand for periods when income is lost. 2. Production: The production processes are more complex and

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clearly regulated. Therefore, cautious advance planning is required. Furthermore, the farmers and entrepreneurs involved are not united, which is a cause for many limitations. 3. Standards: Organic farming products continue to involve complex inspection and certification processes without uniformity. At present, there are many regulatory bodies such as the Department of Agriculture, Department of Fisheries, Department of Livestock Development and Rice Department [5]. However, there is no common certification mark for organic products that is mutually accepted by various agencies. As for export, a central organic farming standard for use in every country does not exist. Therefore, entrepreneurs seeking to export to various countries have to request inspection and certification from a certification body of each trade partner country, which is expensive; furthermore, Thailand has very few suitable qualifications. 4. Marketing: The demand for organic products in Thailand remains low. Consumer awareness about food safety has yet to reach the level in developed countries. In foreign markets, Europeans remain uninformed about Thai organic farming products.

#### B. Behavior and Factors Affecting Decisions to Purchase Products

Consumer behavior means the purchase behavior of consumers at the final stage of product or service purchased for consumption. Differences in consumer behavior exist demographically [7] such as age, income, education, religion, culture, traditions, values and tastes. Therefore, consumption and purchase behavior and consumer opinions toward different products have led to purchases of various different products and services. Apart from demographic characteristics, other factors affecting different consumer behavior [8] include cultural factors, social factors, personal factors and psychological factors.

As for organic food, the purchase behavior and driving factors are of interests in numerous studies. In the case of Thailand, a few studies can be found in various parts of the countries. For example, Kongsom and Kongsom [10] conducted a survey of 2,575 consumers across Thailand, and found that more than 60% of respondents realized that organic agriculture did not allow the use of chemicals. However, most consumers had little understanding about the different types of agricultural standards.

In terms of motives for buying organic food, health and environmental concerns seem to be the main driving factors as reflected in a study conducted in Chiangmai province [11] and Bangkok province Schobesberger [5]. Similarly, Basha et al. [9] studied the prominent motivating factors driving the purchase of organic food in India, and found that the motivating factors included environmental concern, health concern and lifestyle, and product quality.

This research aimed at investigating demographic characteristics and factors affecting organic rice purchasing behavior in Thailand. Rice is chosen as the case study because it is the staple food of Thai people. The findings can be useful in future efforts of promoting organic rice production and

consumption in Thailand.

### III. RESEARCH METHOD

In order to learn about the behavior and factors affecting the purchase decisions of rice consumers, a set of questionnaires were constructed and divided into the following three parts: (1) demographic data; (2) rice purchase behavior and factors affecting purchases, and (3) knowledge and attitudes of respondents about organic rice. The data was collected during July-August 2016 via e-surveys (Google form) while field data collection was conducted in supermarkets and organic product exhibitions to obtain 433 respondents based on the sample size determination with 95% reliability and population size greater than 100,000 people [12]. Descriptive statistics was used to analyze the differences between the types of respondents on decisions to purchase rice, and  $\chi^2$  test was used (at 5% level of significance) to evaluate the inter-group correlations.

### IV. RESULTS OF CONSUMER SURVEY

#### A. Demographic Data and Rice Consumption Behavior

This section presents the findings on consumption behavior of general rice (including all types of rice). According to the data collected, the respondents could be divided into 228 males and 205 females. Table 1 illustrates the demographic profiles of respondents. For the ages of respondents, the majority of them were between 20-29 years (42.7%), followed by 30-39 years (36.3%). Up to 58.2 percent of the respondents held bachelor's degrees (83.6%), lived within the Bangkok Metropolitan Area and worked as company employees (46.9%) with income of 15,000-25,000 baht (41.3%). On the number of family members, the majority of respondents had a family with three to four members with children and elderly included. It was found that the majority of respondents cooked rice for consumption every day (54.7%), and supermarkets were the preferred choice for rice purchase, followed by convenience stores and grocery stores at second and third places respectively. The majority of consumers purchased rice once a month and purchased five kilograms each time (54.6%).

TABLE I  
DEMOGRAPHIC DATA OF INTERVIEWERS

Variable	Number of interview	%
<b>Gender</b>		
male	228	52.7%
female	205	47.3%
<b>Age</b>		
20-29 years	185	42.7%
30-39 years	157	36.3%
40-55 years	70	16.2%
56-70 years	21	4.8%
<b>Education</b>		
Secondary Education	18	4.2%

Diploma	104	24.0%
Bachelor	252	58.2%
Postgraduate	59	13.6%
<b>Residence</b>		
Bangkok & Perimeter	362	83.6%
North	7	1.6%
Center Region	33	7.6%
South	8	1.8%
East	9	2.1%
Northeast	12	2.8%
West	2	0.5%
<b>Occupation</b>		
Official/State enterprise	123	28.4%
Employee	203	46.9%
Business	50	11.5%
Housewife	6	1.4%
Retire	13	3.0%
Other	38	8.8%
<b>Income</b>		
Below 15,000 Baht	116	26.8%
15,000 - 25,000 Baht	179	41.3%
25,001 - 40,000 Baht	94	21.7%
40,001 - 60,000 Baht	27	6.2%
60,001 Baht or more	17	3.9%
<b>Number of family members</b>		
1 person	30	6.9%
2 persons	64	14.8%
3-4 persons	204	47.1%
5 persons or more	135	31.2%

The most popularly consumed rice was polished white jasmine rice (79%), followed by brown rice (27.5%) and riceberry rice (26.1%). The majority of the respondents cooked only one type of rice (63%), followed by mixed rice (37%) with preferred ratios at 1:1 and 2:1. The majority of the respondents mixed jasmine rice with other types of rice such as brown rice, riceberry rice, aromatic black rice and coarse rice, depending on individual preferences.

Fig. 1 displays rice purchase behavior. It can be seen that the respondents generally purchased the same type of rice without changes – B<sub>1</sub> (37%) and the same brand – B<sub>2</sub> (25%), followed by purchases in rotation between various types – B<sub>3</sub> (20%), and purchases without consideration for brands – B<sub>5</sub> (10%). In addition, respondents generally preferred well-known brands (8%).

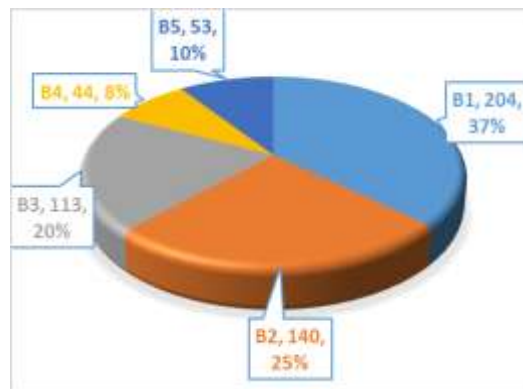


Fig. 1 Percentage of rice purchase behavior.

Fig. 2 shows the percentage of factors influencing rice purchasing decision. The table reveals that the top factor influencing rice purchase decisions is flavor (46%), followed by nutritional value (30%), price (16%) and popularity (5%). In addition, three percent of respondents purchased rice based on other factors such as leading supermarket promotions, rice softness (after cooking) and insufficiency of homegrown rice.



Fig. 2 Percentage of factors influencing rice purchasing decisions.

TABLE II-V illustrate the marketing factors that influenced the purchase decisions of rice consumers, namely, product, price, place and promotion, as shown in TABLE II - V. It is obvious that one of the product-related factors affecting decisions to purchase rice was organic, followed by flavor and nutritional value. For price-related factors, the three most influential ones were prices commensurate with quality, prices commensurate with amount, and inexpensiveness when compared to other brands. For place-related factors, the most frequently encountered factor was convenience, followed by conspicuous product placement and home delivery services. As for promotion, the factors most frequently affecting purchase decisions were product amount increase, followed by product display at the point of sale and gifts.

TABLE II  
PRODUCT-RELATED FACTORS AFFECTING DECISIONS TO PURCHASE RICE

Factors	N	Mean	Std. Deviation
Taste	433	4.42	.707
Package	433	3.66	.924
Quantity	433	3.91	.850
Brand	433	3.75	.860
Nutrition	433	4.39	.725

Information	433	3.98	.902
Novelty	433	3.48	.950
Organic	433	4.47	.733

TABLE III  
PRICE-RELATED FACTORS AFFECTING DECISIONS TO PURCHASE RICE

Factors	N	Mean	Std. Deviation
Quality	433	4.52	.609
Quantity	433	4.29	.706
Compare with another rice	433	4.10	.797
Compare with another brand	433	4.14	.768
Fixed Price	433	4.06	.831

TABLE IV  
LOCATION-RELATED FACTORS AFFECTING DECISIONS TO PURCHASE RICE

Factors	N	Mean	Std. Deviation
Easily Purchased	433	4.44	.639
Easy to find	433	4.07	.844
Delivery	433	3.32	1.196

TABLE V  
ADVERTISING-RELATED FACTORS AFFECTING DECISIONS TO PURCHASE RICE

Factors	N	Mean	Std. Deviation
Advertising	433	3.64	.914
Exhibition	433	3.78	.902
Gifts	433	3.69	1.025
Tester	433	3.59	1.061
Increase quantity	433	3.83	.955

When the influence of personal factors on organic rice purchase decisions were considered using  $\chi^2$  test as shown in TABLE VI, it was found that gender, education, residence and occupation had no effects on rice purchase decisions, while age, number of family members and income had significant influence on rice purchase decisions at 5% level of significance. Age between 20-39 had the most influential decision in the family when it comes to purchasing rice. These people tend to have monthly income between 15,000-25,000 baht. Families with three members or more tend to purchase rice for cooking rather than having meals outside.

TABLE VI  
EFFECTS OF PERSONAL FACTORS ON PURCHASE DECISION

Hypothesis: Personal factors do not affect the decision making of rice.	Statistical Significance at 0.05		Result
	Sig.	Non Sig.	
Gender		0.315	Accepted
Age	0.004		Reject
Education		0.860	Accepted
Residence		0.816	Accepted
Occupation		0.145	Accepted
Income	0.001		Reject
Number of family members	0.050		Reject

**B. Knowledge and Attitudes about Organic Rice**

The questions on organic rice found that 230 of the 433

respondents knew about organic rice (53.1%). The majority of the 230 aforementioned respondents knew about organic rice through the media (62.7%), followed by recommendation from other people (16.7%) and discovering on their own (20.6%) as shown in Fig. 3. For the respondents that knew about organic rice, up to 55.9 percent purchased organic rice for consumption on a regular basis. Fig. 4 illustrates the reasons for purchasing organic rice. It can be seen that the primary reason was for their own health – R1 (27%), followed by their family’s health – R2 (26%), nutritional value – R4 (24%), environmentally friendly production processes – R3 (16%), flavor – R6 (5%) and popularity at the time – R5 (6.6%) as shown in Fig 4. Of the 230 respondents, 53 percent generally purchased organic rice from a supermarket, followed by product exhibition (29.3%). Furthermore, some respondents preferred to directly purchase rice from organic rice farmers. In addition, there were respondents who knew about organic rice and did not purchase organic rice due to rarity (45.7%), followed by lack of popularity (34.7%) and expensive price (20.8%).

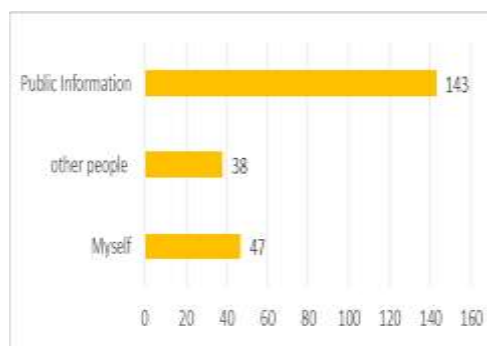


Fig. 3 Source of information about organic rice.

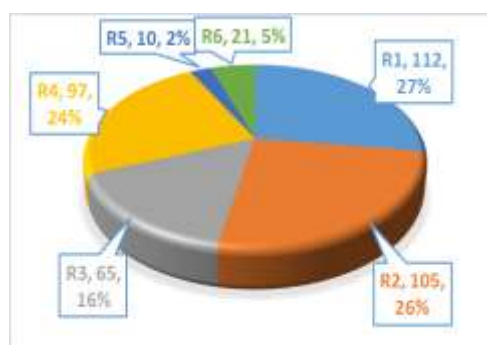


Fig. 4 Reason for purchasing organic rice.

Meanwhile, data on 203 respondents who did not know about organic rice showed that factors causing the lack of knowledge on organic rice were lack of public information (77.8%), lack of popularity (18%), and others (4.1%) as shown in Fig. 5. Other factors are related to the lack of interests from consumers due to the belief that chemical residue would be regulated to remain within acceptable safety standards for consumption.

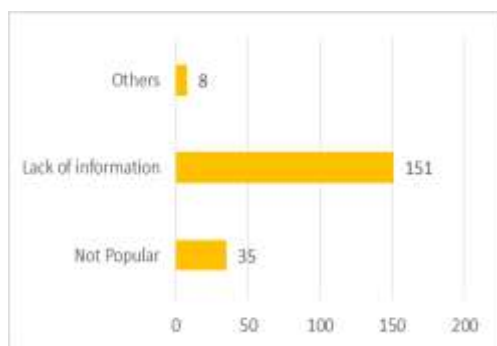


Fig. 5 Distribution of reason for those who did not know about organic rice.

When the influence of personal factors on awareness of organic rice were considered using  $\chi^2$  test as shown in TABLE VII, it was found that the personal factors that produced significant differences were age, education, occupation, income, and number of family members.

TABLE VII  
INFLUENCE OF PERSONAL AWARENESS OF ORGANIC RICE

Hypothesis: Personal factors do not affect the awareness of organic rice.	Statistical Significance at 0.05		Result
	Sig.	Non Sig.	
Gender		0.530	Accepted
Age	0.000		Reject
Education	0.008		Reject
Residence		0.992	Accepted
Occupation	0.000		Reject
Income	0.000		Reject
Number of family members	0.048		Reject

TABLE VIII showed the percentage of demographic characteristics of awareness about organic rice. In this study men (52.61%) were more aware of organic rice than women (47.39%). However, there was a slightly larger percentage of women who purchased organic rice. This was similar to the findings discussed in Roitner-Schobesberger et al. [5]. The reason might be that women tended to be more health conscious than men as supported by [16]. People aged between 30-39 years had the greatest awareness of organic rice as well as being the top group of purchasing organic rice. The same results were found in Ueasangkomsate and Santiteerakul [17] which showed that ages between 31 to 40 years had more interests in organic food than other groups. In terms of education, the greatest percentage of respondents who were aware of organic rice held bachelor degrees. Similar findings were also discussed by Ueasangkomsate and Santiteerakul [17]. Respondents with monthly salary between 25,001 - 40,000 baht had the highest willingness to buy organic rice. Finally, families with 3-4 members had the greatest interest and greatest willingness to purchase organic rice.

TABLE VIII  
DEMOGRAPHIC GROUP OF ORGANIC RICE AWARENESS

Variable	Awareness of Organic Rice?		Purchase of Organic Rice?	
	Yes (%)	No (%)	Yes (%)	No (%)
<b>Gender</b>				
male	52.61	52.71	48.98	59.26
female	47.39	47.29	51.02	40.74
<b>Age</b>				
20-29 years	32.17	54.68	27.21	41.98
30-39 years	39.13	33.00	37.41	40.74
40-55 years	21.30	10.34	23.81	17.28
56-70 years	7.39	1.97	11.56	0.00
<b>Education</b>				
Secondary Education	4.35	3.94	6.12	1.23
Diploma	24.35	23.65	17.69	37.04
Bachelor	52.61	64.53	54.42	49.38
Postgraduate	18.70	7.88	21.77	12.35
<b>Occupation</b>				
Official/State enterprise	36.96	18.72	40.14	29.63
Employee	38.26	56.65	33.33	48.15
Business	10.87	12.32	9.52	13.58
Housewife	0.87	1.97	1.36	0.00
Retire	4.78	0.99	7.48	0.00
Other	8.26	9.36	8.16	8.64
<b>Income</b>				
Below 15,000 Baht	20.43	33.99	18.37	23.46
15,000 - 25,000 Baht	36.52	46.80	29.93	49.38
25,001 - 40,000 Baht	30.00	12.32	34.01	22.22
40,001 - 60,000 Baht	8.26	3.94	10.20	4.94
60,001 Baht or more	4.78	2.96	7.48	0.00
<b>Number of family members</b>				
1 person	6.96	6.90	6.80	6.17
2 persons	18.70	10.34	18.37	19.75
3-4 persons	47.39	46.80	46.94	48.15
5 persons or more	26.96	35.96	27.89	25.93

V. CONCLUSIONS

Data analyses on rice purchase behavior found that the rice most popularly purchased was polished white jasmine rice. The majority of respondents purchased rice one a month at five kilograms per time. The respondents preferred ordinary and organic rice sold in supermarkets due to convenience and accessibility, which concurred with the place-related marketing factors affecting consumer decisions [13]. The consumers gave the highest priority to convenience. This was in line with the findings discussed by Guerrero et al. [14] and Buckley et al. [15] who found that convenience was an important parameter in food purchasing decision.

As for awareness and knowledge of organic rice, some respondents were aware of organic rice and decided to buy it, while some had knowledge of organic rice but did not purchase it for consumption. For those who had knowledge of organic rice and purchased it for consumption, they reasoned their choice for organic rice consumption as for their own health and for the environment. This is in line with the findings already cited in the literature [5] [17]. For the respondents who knew about organic rice but chose not to purchase them for consumption, the reasons were due to difficulties in finding the product and the unpopularity of organic rice. Some people (4.1% of those who know the benefits of organic rice but did not buy organic rice) believed that chemical residue found in agrochemical rice would already be regulated to be within the acceptable safety standards for consumption.

It is obvious that organic rice production in Thailand faces marketing challenges due to limited awareness and limited information access [4], [8], [10] leading to limited domestic sales. In addition there is little awareness on the environmental impact of agrochemical production on the part of farmers.

In the past, the government did not implement appropriate campaign, nor did it promote or provide accurate knowledge and understanding about organic rice to farmers and consumers. This led to insufficient awareness on the importance of organic food production and consumption. Hence, there is a need to promote proper organic farming and promote acceptance of organic farming in line with international standards. This can be done by various parties such as government, non-profit organizations, or other stakeholders such as knowledgeable consumers. This may lead to increased farmers' income, increased value of rice, conservation and restoration of environment, and improved quality of life for Thai farmers. In fact, the Thai traditional wisdoms can be very useful since it involves natural farming that is essentially organic by nature.

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#### REFERENCES

- [1] P. Sangkumchalianga and W.C. Huang, Consumers' Perceptions and Attitudes of Organic Food Products in Northern Thailand International Food and Agribusiness Management Review 15 (2012), 87 – 102.
- [2] B. Jacopo, F. Alessandra, N. Marco, B. Stefano and F. Marco, Organic production systems: Sustainability assessment of rice in Italy, Agriculture, Ecosystems and Environment 225 (2016), 33 – 44. <https://doi.org/10.1016/j.agee.2016.03.046>
- [3] T. Jaya, Green marketing in India: An Overview, Journal of Business and Management (IOSR-JBM), 33 – 40.
- [4] Greenet, Thai organic market. <http://www.greenet.or.th>
- [5] R.S. Birgit, D. Ika, S. Suthichai and R.V. Christian, Consumer perceptions of organic foods in Bangkok, Thailand, Food Policy 33 (2008), 112–121. <https://doi.org/10.1016/j.foodpol.2007.09.004>
- [6] Department of International Economic Affairs. <http://www.mfa.go.th/business>
- [7] K.C. Williams and R.A. Page, Marketing to the Generations, Journal of Behavioral Studies in Business (2010), 1-17.
- [8] W. Sriprasert and R. Vilamas, The Marketing Factors Affecting the Purchasing Behavior and Consumption Brown Rice of Consumers in Muang District, Maha Sarakham Province, Rajabhat Maha Sarakham University Journal; RMUJ. 5(3): September - December (2011), 137-152.
- [9] M. B. Basha, C. Mason, M. F. Shamsudin, H. I. Hussain and M. A. Salem, Consumers Attitude Towards Organic Food, Procedia Economics and Finance 31 (2015), 444 – 452. [https://doi.org/10.1016/S2212-5671\(15\)01219-8](https://doi.org/10.1016/S2212-5671(15)01219-8)
- [10] W. Kongsom and C. Kongsom, Consumer Behavior and Knowledge on Organic Products in Thailand, International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering 10:8 (2016), 2524-2528.
- [11] P. Somsak, and M. Blut, An Evaluation of Buying Behavior and Perception of Organic Vegetable Consumer in Chiang Mai Province, The Asian Business and Management Conference 2012, Osaka, Japan
- [12] T. Yamane, Statistics: An Introductory Analysis. Third edition. New York: Harper and Row Publication, 1973.
- [13] B. Wierenga, Competing for the Future in the Agricultural and Food Channel, Chapter book: Agricultural Marketing and Consumer Behavior in a Changing World, (1997), 31-55.
- [14] L. Guerrero et al., Consumer-driven definition of traditional food products and innovation in traditional foods. A qualitative cross-cultural study, Appetite 52, (2009), 345–354 <https://doi.org/10.1016/j.appet.2008.11.008>
- [15] M. Buckley, C. Cowan, and M. McCarthy, The convenience food market in Great Britain: Convenience food lifestyle (CFL) segments, Appetite 49, (2007), 600–617. <https://doi.org/10.1016/j.appet.2007.03.226>
- [16] P. Jaroenwanit and P. Kantatasiri, Consumer Perception and Attitude Study for Market Development of Hommali Organic Rice Products from Thung Kula, Thailand, GMSARN International Journal 8, (2014), 89 - 96
- [17] P. Ueasangkomsate and S. Santiteerakul, A study of consumers' attitudes and intention to buy organic food for sustainability, Procedia Environmental Sciences 34, (2016) 423-430. <https://doi.org/10.1016/j.proenv.2016.04.037>

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