

The Study of Quality and Standard Upgradation of Aromatic Coconut of Thailand for Exportation to China

Suppara Charoenpoom*

College of Innovation and Management, Suan Sunandha Rajabhat University, Bangkok, Thailand
*suppara.ch@ssru.ac.th

Muhammad Shahid Khan

College of Innovation and Management, Suan Sunandha Rajabhat University, Bangkok, Thailand
shahid.kh@ssru.ac.th

Saruda Jitpukdeerat

School of International Relations and Center for Southeast Asian Studies, Xiamen University
Xiamen, China
saruda.ji@gmail.com

Barameeboon Sangchan

College of Innovation and Management, Suan Sunandha Rajabhat University, Bangkok, Thailand
barameeboon.sa@ssru.ac.th

Pimploi Tirastittam

College of Innovation and Management, Suan Sunandha Rajabhat University, Bangkok, Thailand
pimploi.ti@ssru.ac.th

Phutthiwat Waiyawuththanapoom

College of Logistics and Supply Chain, Suan Sunandha Rajabhat University, Bangkok, Thailand
phutthiwat.wa@ssru.ac.th

ABSTRACT

The purposes of this research were; 1) to examine the quality of aromatic coconut for exportation to China; 2) to define guidelines of the upgrading quality and standard of aromatic coconut for exportation to China. A qualitative method was adopted in this study and the sampling group consists of agricultural experts, experts in agriculture export services and experts in agricultural production promotion and development, totally 9 participants were selected by purposive sampling and the research instrument for data collection was an in-depth interview form.

The research findings revealed that there were 11 aspects of Ratchaburi aromatic coconut' s standard for exportation to China; 1) selecting of aromatic coconut produces before trimming having 3 indicators, 2) selecting of aromatic coconut produce after trimming having 3 indicators, 3) minimum quality of all sizes of trimmed aromatic coconuts having 7 indicators, 4) defects on external surface of the produce that cannot be exported to China having 7 indicators, 5) harvesting fruit age after the full bloom of the spadix having 2 indicators, 6) sizing and weighting per each of the produce having 4 indicators, 7) a quantity of the produce per packaging box having 2 indicators, 8) preservative temperature having 4 indicators, 9) criteria for size tolerances of trimmed produces within the same package having 1 indicator, 10) packing and placing sequence having 7 indicators

and 11) container having 4 principal indicators and 7 sub-indicators. After consideration of all aspects, it can be concluded that there are 2 main schemes for implementation of upgrading the aromatic coconut's quality and standard to be exported to China; plantation & harvest measure and selecting & packing the produces measure.

Keywords: Aromatic coconut / Quality / Standard

INTRODUCTION

Thailand's economy has currently relied on both imports and exports while trading competition has dramatically increased in which there are both advantages and disadvantages from the free trade area. And, this is a cause of economic cooperation and arrangement of trade agreements between Thailand and many other countries and also entering into the free trade area (FTA) by signing both bilateral and multilateral framework agreements i.e. ASEAN FTA (AFTA) between Thailand & China, Thailand & Australia, Thailand & New Zealand, Thailand & Japan, Asean & China, Asean & Japan, etc., Generally, even though Thailand has gained benefits from FTA, there remains some affected groups of agricultural commodity whereas the effect severity level has been varied based on competitiveness of each product (Office of Agricultural Economics, 2015, p.7). Nevertheless, since Thailand is a country where diversified vegetables and fruits can be planted and produced, the agricultural commodity thereby are exported ones enhancing a huge of income gain to the country., The number of fruit exports In each year creates high income of nearly twenty thousand million Baht and China is the big exporting market contributing more income to Thailand especially after FTA framework agreements had been made for vegetables and fruits between Thailand & China effective since October 1, 2007 which results in an expansion of vegetable and fruit trading. In addition, further to the reduction of fruit import duty of 0 % since 2007, Thailand has gained benefits numerously from tropical fruit exports to China (TAP Magazine, 2017). In 2018, the fruits exported to China costed Baht 23,152.32 or 40 % of a total of Thai fruit export values showing an expansion of 51.11 %.

Aromatic coconut is another significant economic crop and considered as a unique crop of Thailand having the trend of increasing consumption demand especially the continuous growth of international markets. Since people through the world currently turn to pay more attention to health issues and the aromatic coconut is a crop, Which is fully enriched with nutrition. In 1991, the aromatic coconut exported from Thailand was costed 41 million Baht increasing to 235 million Baht and 413 million Baht in 2001 and 2010, respectively (Thai Customs Department, 2010) and approximately 3,000 million Baht in 2015. In 2001, a total of exported aromatic coconut was approximately 16,088 tons increasing to 33,249,697 tons in 2010. The largest and number one aromatic coconut in a form of coconut juice which distributed from Thailand is the United States of America. (Ratchaburi Agricultural Research & Development Centre, 2016) Furthermore, the order from Asian regions such as China, Hong Kong, Australia and Singapore order the aromatic coconut in a form of trimmed coconut. (Kittisak Pipatkanaporn, 2016; Ratchaburi Agricultural Research & Development Centre, 2016) The details of the export value present in Table 1-2.

Table 1 Value of Aromatic Coconut Exporting from Thailand in the Top 10 Countries in 2015

No.	Country	Value (USD)
1	USA	18,999,208
2	China	15,866,069
3	Hong Kong	5,532,196
4	Australia	4,664,614
5	Singapore	2,172,924
6	Laos	1,924,814
7	Netherlands	1,873,384
8	Taiwan	1,480,879
9	England	1,187,741
10	United Arab Emirates	1,024,415

Source : Ministry of Commerce, 2016 (as cited in Kittisak Pipatkanaporn, 2016, p.4)

Month / Year	2012	2015	2017
January	19,750	176,281	186,545
Febuary	12,500	164,305	242,930
March	8,651	221,371	314,018
April	9,250	373,436	294,227
May	15,150	258,359	164,139
June	42,225	214,614	161,882
July	33,340	320,225	311,417
August	85,680	334,177	437,424
September	101,245	428,545	484,476
October	115,350	435,201	481,240
November	134,950	468,904	539,682
December	148,750	465,211	418,045
Total / number of the produce	726,841	3,860,629	4,036,025

Table 2 Quantity of Aromatic Coconut Exporting from Ratchaburi Province in 2012 – 2017

Source : The Organic Community Enterprise in Ratchaburi Province of Thailand, 2019

Recently, facing the problems of drought and pest spreading in many significant areas of aromatic coconut source including farmers' lack of production quality control and proper fertilization, the aromatic coconut export situation of Thailand has been strictly enforced by the phytosanitary measure of China, one of the large aromatic coconut importer. In 2010 – 2012, the General Administration of Quality Supervision Inspection and Quarantine of the People's Republic of China (AQSIQ) sent a report to the Ministry of Agriculture and Cooperatives, Thailand to inform that overuse of pests and residues in the agricultural commodity exported from Thailand were found and could result in future decision making of clients' purchase (Orathai Euatragul, 2015, p. 62). Although the Ministry of Agriculture and Cooperatives recently established the 2012 – 2016 strategies of aromatic coconut consisting of 4 strategies; production development, agriproduct processing development, marketing and management to develop in all areas including establishment

of quality and standard control system for Thailand's agricultural commodity to be secured as per the international standard (FAQ/Codex) that has been established since 1983. In the meantime, even though the Department of Agriculture has tried to establish the quality control system for agricultural service by implementing the development of quality certifying with "Q" logo, the residues in agricultural crops remain found and exceeds the safety factor. In 2014, the residues remained found in agricultural crops certified by "Q" standard and 62.5 % of them did not reach the MRLs standard (ASTV Manager, 2014).

Due to the abovementioned reasons, the researcher therefore is interested to analyze and increase the aromatic coconut's potential for sustainable exports to China as well as presenting details gained from this study for being used as a guideline to develop the aromatic coconut's quality to be competitively exported to international markets with globally accepted reliability.

LITERATURE REVIEW

To upgrade the quality of Thailand's aromatic coconut for exportation to China, the concepts, theories, documents and relevant research studies had been reviewed to be applied for further implementation. There are general pieces of information of aromatic coconut, concept of consumer's expectation on quality factors and quality control, concept of agricultural product standards, concept of customer satisfaction and intention of repurchase and other relevant studies.

Aromatic coconut is grown from *Cocos nucifera* L. of Arecaceae family, a dwarf type mutant from "Moo See Kheaw", and originated in Nakhon Chaisri District, Nakhon Pathom Province. Nowadays, most of them were planted in Ratchaburi, Samut Songkhram, Samut Sakhorn and Chachoengsao. With a variety of characteristics different from other general coconuts, especially having unique and aromatic sweet taste more than aromatic coconuts of other export competitors like Philippines and Indonesia, this makes it widely acceptable among foreign consumers.

In general, the quality factor is an indicator of decision making on acceptance or nonacceptance towards the quality of agricultural commodity and it is a self-determination by using 5 basic senses of human through eyes, ears, nose, mouth, hands or touch surface which are the sense organs or testers for varied quality factors integrated as the characteristic of quality of each type of agricultural commodity. This quality factor observable by consumers can be divided into 3 types based on reflection of product's quality towards users or consumers as shown in figure 1 (Boonlong, N. n.d., p.31).

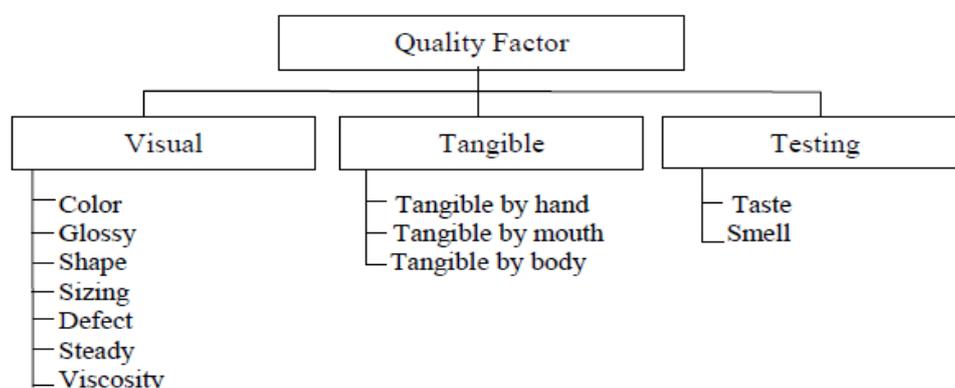


Figure 1: The observable quality factor

Source: Boonlong, N., n.d.

From figure 1 representing the quality characteristic observable by consumers can be verified by self-touching sense indicating a variety of quality appeared in a certain agricultural product. This quality factor is thereby divided into 3 types; appearance quality factors or eye appeal, hand or mouth feel, and taste or smell, respectively. The visual appeal is inspected by consumers' eyes which is a familiar factor or past experienced until the quality is accepted such as observation on fruit surface color reflecting ripeness, etc. These factors consist of color, glossiness, size and shape, defect and steadiness.

As currently, consumers pay more attention to their health, the protection of consumer hygiene is then essential and it is also an era of boundless and free trades in which the same type of agricultural commodity can be supplied in many sources around the world. The quality of food and agricultural commodity thereby plays a vital role increasingly and the said standard shall be a provision of criteria in monitoring the inspection and assessment of production, exports and imports in which the indicators are used as the main tools. The following concepts as well as other practices concerned with aromatic coconut were considered by the researcher on the concept of the agricultural commodity standards; the Good Agricultural Practice : GAP, Integrated Pest Management : IPM, Geographical Indications : GI, Good Manufacturing Practice : GMP, Codex Alimentarius, Thai Agricultural Commodity and Food Standard of Aromatic Coconut and China' s fruit import measure under General Administration of Quality Supervision Inspection and Quarantine of The People's Republic of China: AQSIQ.

The Good Agricultural Practice : GAP is the practice focusing on sustainability of environment, economy and society in farming process which shall affect the quality and security of food and agricultural commodity. For Thailand, the Department of Agriculture, Ministry of Agriculture and Cooperatives is an authority who certifies the quality management system of good agricultural practice for plants, establish the provisions, criteria and method of assessment in compliance with the international standard of GAP to be used as the standard of farming production in Thailand. The provisions consist of water resource, planting area, usage of pesticides, preservation and carriage of produce within plots, data recording, planting without pesticides, production management for qualified produces and harvesting including execution after harvesting. In view of the integrated pest management concept, it means an integrated planning to control, protect and eliminate animal carriers and pests through an integration of several methods based on the principle and ground of understanding in eco-system of animal carriers and pests to minimize the number of pest population with the least possible disruption to agroecosystems (BSC Intertech, 2018).

Geographical Indications: GI is a sign used on products that have a specific geographical origin and possess qualities or a reputation that are due to that origin. GI has arisen from the linkage between nature and human being ; in other words, a community relies on a particular characteristic of geographical origin i.e. weather condition or raw materials in a particular area to be derived for local goods production reflecting its particular characteristic and such a particular characteristic may be quality, reputation or other characteristics originated from that geographical area (<http://www.sme.go.th/>). Moreover, the GMP or Good Manufacturing Practices were also studied since they were the good practices for food production and quality assurance system applied and proven by food academicians throughout the world that can ensure accepted reliable safety of consumers. The provisions of GMP for controlling food product quality to be safe according to the standard are inclusive with essential issues; location and manufacturing building, tools, machinery,

manufacturing appliances, production process control, sanitation, maintenance & cleaning, personnel and hygiene of operators.

Codex Alimentarius is the standard recognized by the World Trade Organization (WTO) as per the Agreement on Technical Barrier to Trade (TBT) and Agreement on the Application of Sanitary and Phytosanitary Measure (SPS) which emphasizes on participation in the international standard establishment and also the recommended standard to be referred for national standardization and as an international reference point for the resolution of international trading disputes (National Bureau of Agricultural Commodity and Food Standards, 2011). Furthermore, the National Bureau of Agricultural Commodity and Food Standards has established the standards of aromatic coconut containing details of content i.e. scope, definition, quality, sizing, size tolerance, packaging & placing, marking & labelling, contaminants, pesticide residues, hygiene and method of analysis and sampling. After continuously finding numerous diseases and pests in exported fruits from Thailand, China therefore has enforced its preventive measure to the exporters of an agricultural commodity to be firstly certified by China's inspection before being imported. One part of the said measure is defining specification and inspection of cold treatment, an inspection of packaging in terms of cleanliness, hygiene, convenience for usage, internal and external inspection of packing box that should be no contamination of worm, fungus, weeds, soil, twigs or other hazardous leaves, and inspection of fruit sampling (General Administration of Quality Supervision, Inspection and Quarantine; AQSIQ of People's Republic of China, 2014).

As per the literature review and initial information survey, the researcher applied the Codex Alimentarius and the National Bureau of Agricultural Commodity and Food Standards for Aromatic Coconut (2008) to define a guideline of agricultural commodity quality development for aromatic coconut to be exported to China since the classification of contents is appropriate, clear and tangible as represented in the conceptual framework of figure 2.

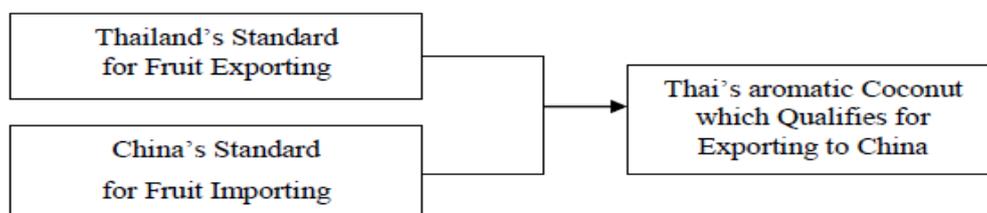


Figure 2: Conceptual Framework

METHODOLOGY

This research is the qualitative research. An in-depth interview was conducted among 3 groups of participants comprising; the 1st group - 3 agricultural experts having experience in aromatic coconut planting in Ratchaburi's area for not less than 5 years, the 2nd group - 3 experts in export services of agricultural commodity which are the entrepreneurs in Ratchaburi owning GMP certified packing houses and being aromatic coconut exporters to China, and the 3rd group – 3 experts in agricultural production promotion and development having experience in aromatic coconut and who have worked for not less than 5 years with the Department of Agriculture Extension, Ministry of Agriculture and Cooperatives.

The research instrument used for data collection is divided into 2 types; a structured interview form that the researcher designed in compliance with the Codex Alimentarius Standards accepted by WTO as per the Agreement on Technical Barrier to Trade; TBT and Agreement on the Application of Sanitary and Phytosanitary Measure; SPS (National Bureau of Agricultural Commodity and Food Standards, 2011), and the instrument for inspection of appropriateness the researcher designed based on the focusing points that were initially proposed to 9 experts for review and comment in an assessment form to find out the average mean of compliance according to the index of concordance (IOC) (Suwimon Tiraganunt, 2014).

FINDINGS

The study as per the 1st objectives is to examine the aromatic coconut's standard of Thailand for exportation to China from which the research findings reveal that there are 11 aspects of standard that can be summarized as follows :

1. Selecting of the aromatic coconut produces before trimming which has 3 indicators; 1.1) 2% of all aromatic coconuts should be conducted by random sampling of thickness and sweetness, 1.2) all defected ones should be taken off, and 1.3) classification of sizing should be conducted for all aromatic coconut produces.
2. Selecting of the aromatic coconut produces after trimming which has 3 indicators; 2.1) all aromatic coconut produces should be soaked in solution to extend the age of preservation, 2.2) all produces should be screened to take off the defected ones upon visual inspection, and 2.3) all produces should be passed the classification process of sizing and weighting.
3. The minimum quality of all sizes of trimmed produces which has 7 indicators; 3.1) the produce is in a tapered-cylinder form with cone-cover top and removal of all green exocarp, 3.2) being fresh in natural white color, 3.3) all parts of the produce are clean, 3.4) no abnormal smell, 3.5) having approx.. 1.5-2 layers of coconut fresh, 3.6) having the sugar content from 7% brix up with fragrance water, and 3.7) no obvious defect on external surface as stated in the defect indicators, item 4.1 – 4.7.
4. Defects on external surface that cannot be exported to China which have 7 indicators; 4.1) incomplete shape, 4.2) brown surface, 4.3) cracked surface, 4.4) bruising on surface, 4.5) deep wound on surface, 4.6) notch on surface, and 4.7) fungus on surface.
5. Harvesting fruit age after full bloom of the spadix which has 2 indicators; 5.1) between 190-200 days (having 1 ½ layers of fresh), and 5.2) between 200-210 days (having 2 layers of fresh).
6. Sizing and weighting per produce which have 4 indicators; 6.1) Jumbo size weighting from 1,300 grams up each, 6.2) A size weighting from 1,000 – 1,300 grams each, 6.3) B size weighting from 900-1,000 grams each, and 6.4) C size weighting from 800-900 grams each.
7. A quantity of the produce per packing box which has 2 indicators; 7.1) 9 produces contained per box, and 7.2) the number of the produce in each box to be varied according to clients' requirement.
8. The preservative temperature which has 4 indicators; 8.1) using room temperature during selecting and trimming of shape, 8.2) using temperature at 23-25 °C during packing, 8.3) using temperature at 15 °C for storing room of the packed boxes, and 8.4) using temperature at 2-4 °C for waiting room before being transported.

9. Size tolerance of the trimmed produces within the same box which has 1 indicator; 9.1) weight of the produces within the same box should be not over than 10% different.
10. Packing and placing which have 7 indicators; 10.1) wrapping the produces passing selecting and sizing process with EPE white foam net, 10.2) rewrapping those produces with plastic wrap, 10.3) attaching a brand sticker above each produce, 10.4) placing each produce in 3 rows having 3 produces each for the package, 10.5) bearing each produce with corrugated paper, 10.6) closing the packed box and tying with a pp-band strapping machine in a widthwise direction, one line per side, and 10.7) labelling a brand sticker on the external side of the packed box.
11. Container which has 4 principal indicators and 7 sub-indicators; 11.1) being a highly durable fruit container made of 5-layer corrugated paper in a form of die-cut box with a closing cover, ventilation hole, handle and barrier paper that can be stored in cold storage room, 11.2) the box size is subject to clients' requirement, 11.3) being a new clean box without any scrap and smell, and 11.4) being labelled with a sticker at a visible position containing the following details.
 - 11.4.1 Name of the Exporting Company :
 - 11.4.2 Fruit Type :
 - 11.4.3 Packing House Register Number (GMP) :
 - 11.4.4 GAP No :
 - 11.4.5 Packing Date :
 - 11.4.6 Export to the People's Republic of China
 - 11.4.7 Product of Thailand

The research results, as per the 2nd objective : to define a guideline of upgrading quality and standard of aromatic coconut of Thailand for exportation to China, reveals that there are 2 main measures; planting & harvesting, and selecting & packing the produces as details shown in the followings:

1. The measure of planting & harvesting consists of promoting the aromatic coconut farmers to manage their farms with the integrated pest management (IPM), promoting the farmers to mainly plant organic aromatic coconut trees, promoting the farmers to be certified for qualified production of the aromatic coconut according to the Good Agricultural Practice : GAP, and promoting the geographical indication : GI registration of aromatic coconut farming owners in Ratchaburi province of Thailand.
2. The measure of selecting & packing the aromatic coconut consist of promoting the packing houses to be certified and operated in compliance with the Good Manufacturing Practice : GMP. Selecting & packing the aromatic coconuts should be inspected in compliance with the standard and all of 11 indicators as described in this study.

CONCLUSIONS AND DISCUSSION

Applying the concepts of the international Codex Alimentarius Standards and the Aromatic Coconut Standards defined by the National Bureau of Agricultural Commodity and Food as a guideline for studying the quality of aromatic coconut of Thailand for exportation to China, it is found that based on the standard criteria of 11 aspects as mentioned above, the aromatic coconut's standard in view of minimum quality of all sizes, selecting of the coconut produces and defects, the quality of

Ratchaburi aromatic coconut is in line with the referred Codex Alimentarius Standards in which the criteria of minimum requirement of quality and quality classification have been defined (National Bureau of Agricultural Commodity and Food, 2011) and also in line with the concept of quality factors that consumers can do self-observation and inspection by using sensory evaluation as an indicator for quality aspects of a certain agricultural product i.e. color, glossiness, size, shape, defect and steadiness (Boonlong, N., n.d., p.31) and in line with the Good Agricultural Practice : GAP in terms of the criteria for production process management for quality products and separating low qualified ones (Department of Agriculture, 2013) including the GMP standards in terms of location, building and environment as well. Nevertheless, there remains problems and limitations regarding data collection from the sampling group showing that the packing house entrepreneurs have some concern with rendering cooperation since in practical, complying with GMP standards and guideline has not been strictly focused on operation inspection by concerned authorities whereas this negligence may subsequently cause an impact to their packing houses in due course.

RECOMMENDATIONS

Further to the field trip study for data collection from which some problems and limitation were found, the researcher thereby recommends that the government should implement the proactive measure for international markets and readiness towards quality inspection and trade barrier measures of the countries importing Thailand agricultural commodity and the Department of Agriculture should encourage farmers to increase planting of organic aromatic coconut including developing knowledge and skill in the technique of aromatic coconut planting for exportation, marketing and on-line trading to avail them an opportunity of direct income gain without relying on intermediary services. In addition, The Department of Agriculture should support and enforce packing houses in Ratchaburi to be certified and operated under the Good Manufacturing Practice : GMP.

REFERENCES

1. Department of Agriculture. (2013). **Agricultural Commodity Standards**. Bangkok. Ministry
2. of Agriculture and Cooperatives.
3. Boonlong, N. (n.d.). **Quality Control**. Ministry of Agriculture and Cooperatives.
4. BSC Intertech Co., Ltd., (2018).//Retrived March 9, 2019,/from/http://www.bscepest.com/
5. site/ipm.htm
6. TAP Magazine. (2017). China: Big Export Market of Thai Fruits.// Retrived March 9,
7. 2019,/from/http://tap-magazine.net/ index.php/2019/ 04/18/thaifruits-2222
8. ASTV Manager. (2014).// Retrived August 20, 2019,/from/https://mgronline.com/
9. General Administration of Quality Supervision, Inspection and Quarantine of People's
10. Republic of China. (2014). **Overall of Testing and Suspension for Fruit Importing**
11. **in China**. Quality Control and Quarantine Bureau of China.
12. Office of Agricultural Economics. (2015). **Annual Performance Report 2014**. Bangkok :
13. Ministry of Agriculture and Cooperatives.
14. National Bureau of Agricultural Commodity and Food Standards. (2011). **Standard of**

Suppara Charoenpoom, Muhammad Shahid Khan, Saruda Jitpukdeerat, Barameeboon Sangchan,
Pimploi Tirastittam, Phutthiwat Waiyawuththanapoom

15. **Rose Apple**. National Bureau of Agricultural Commodity and Food Standards.
16. National Bureau of Agricultural Commodity and Food Standards. (2008). **Standard of**
17. **Aromatic Coconut** . National Bureau of Agricultural Commodity and Food Standards.
18. Suwimon Tiraganunt. (2014). **Research Methodology in Social Science : Guidelines for Action**. Chulalongkorn University Press.
19. Orathai Euatragul. (2015). **Study Causes Thai's Tubtimjun Roseapple use to be**
20. **Suspension to China**. Ministry of Agriculture and Cooperatives.
21. Kittisak Pipatkanaporn. (2016). **An Overview Of Thai Aromatic Coconut Exporting**
22. **Industry**. Master of Science Program in Marketing. Thammasat University.
23. <http://www.chaoprayanews.com/blog/article/2016> (accessed January 8, 2019)
24. <http://www.sme.go.th/> (accessed March 21, 2019)