 DOI: 10.19601/j.cnki.issn1943 - 9903.2017.06.005

International Competitiveness of Export of China's Sweet Orange

Yayan CHEN*

School of Business, Gannan Normal University, Ganzhou 341000, China

Abstract Selecting the market share, trade competitiveness index, revealed comparative advantage (RCA), and revealed competitive advantage index (CA), this paper compared the competitiveness of China and large sweet orange exporters, and made an empirical analysis. Results indicate that in terms of the market share, Spain has prominent advantage in competitiveness of sweet orange; in terms of the trade competitiveness index, Egypt and South Africa have higher competitiveness in the export of sweet orange; in terms of RCA and CA, Egypt has absolute international advantage in the export of sweet orange. China's export competitiveness of sweet orange is much lower than other large sweet orange producers such as Spain, Egypt, and South Africa, and the export capacity is much lower than other large sweet orange producers. In view of current situations, it came up with recommendations for improving export competitiveness of China's sweet orange, including expanding the market, diversifying the varieties, improving the quality, reducing the costs, strengthening cooperation of fruit farmer cooperatives, and enhancing government support.

Key words China, Sweet orange, Export, International competitiveness

1 Introduction

Sweet orange is the main variety of citrus, and the total yield of citrus accounts for 63% of the total yield of citrus in the world. Sweet orange originated from South China and Indo-China Peninsula. In China, the sweet orange planting is mainly distributed in Jiangxi, Hunan, Guangxi, Guangdong, Sichuan, Chongqing, Hubei, Fujian and Yunnan. Sweet orange varieties include navel orange, summer orange, brocade orange and blood orange. In 2009, Jiangxi Gannan region became the largest sweet orange planting area in the world with the yield ranking in the third in the world and the first in Asia. In 2015, the sweet orange yield of China was about 7 million tons, with export of 55300 tons and export of 148400 tons; the total domestic sweet orange was 7.0931 million tons, and the domestic fresh sweet orange consumption was 6.555 million tons, the supply firstly exceeded the demand in the domestic fresh sweet orange market, but the domestic main planting belts of sweet orange were still expanding the scale to increase the yield, leading to increase in sweet orange yield but no increase in the income in recent years. The export volume of China's sweet orange takes up a little portion in the total yield of China's sweet orange and the world's total export volume, which constitutes a striking contrast with China's position of large sweet orange producer. According to the import and export commodities classified in 2016, fresh or dried citrus fruit is 08.05, citrus (Citrus) varieties include sweet orange (Orange, customs code 080510), wide tangerine (Tangerine, customs code 080520), grapefruit and Grapefruit, Lemon and Lime (Lemon, Customs Code 080550) and other citrus fruits (other Citrus, Code 080590), the sweet orange import and export data we selected are international trade goods code for 080510 Commodities.

Received: May 6, 2017 Accepted: June 12, 2017

Supported by the Education Science Research "12th Five-Year Plan" Project of Jiangxi Province (14YB086); Program of Gannan Normal University (15kyw09).

* Corresponding author. E-mail: 56595980@qq.com

2 Current situation of export of China's sweet orange

2.1 The export volume showing an overall growth trend

Main sweet orange planting belts of China energetically developed the sweet orange industry. For example, the navel orange planting area in Ganzhou of Jiangxi increased from 1.2382 million mu in 2006 to 1.68 million mu in 2015. The fresh sweet orange yield increased from 2.85 million tons in 2006 to 6.58 million tons in 2014. The export volume of China's sweet orange showed an overall growth trend in these ten years, the export volume grew from 20.6 million USD in 2006 to 82.02 million USD in 2015, with the annual growth rate of 14.82%. However, such growth was not stable. In 2006 - 2015, the export volume of China's sweet orange experienced two times of dramatic drop. In 2006 - 2010, the export volume of sweet orange continued growing. In 2010, the export volume reached 84.38 million USD, but in 2011, the export volume abruptly dropped to 64.8 million USD, reducing about 23.20% compared with the previous year; in 2012, the export volume of sweet orange rapidly rebounded and reached 91.71 million USD, the growth trend lasted till 2014, the export volume was 108.1 million USD in 2014, but it dropped to 82.02 million USD in 2015, reducing about 24.13% compared with the previous year.

2.2 Ups and downs of the export volume In 2006 - 2015, China's sweet orange export volume experienced three stages of ups and downs. By 2015, the export volume returned to the level ten years ago. At the first stage (2006 - 2009), the export volume of sweet orange increased from 50 million kg in 2006 to a quadrupled level (180 million kg) in 2009; at the second stage (2010 - 2011), the export volume declined at annual rate of 50 million kg, in 2010, the export volume was 139 million kg, in 2011, it dropped to 84 million kg; at the third stage (2012 - 2015), the

export volume temporarily rebounded to 123 million kg, growing 47.92% compared with the previous year, later, it continuously declined. In 2015, the export volume declined to 55 million kg. In these ten years, the average growth of navel orange export volume was only 1.08%.

2.3 The export price showing a rising trend In 2006 – 2015, the export price of China's sweet orange showed an obvious rising trend with slight fluctuation. In 2006 – 2009, the export price was 0.4 – 0.5 USD/kg; in 2010 – 2012, it was 0.6 – 0.8 USD/kg; in 2013, it exceeded 1.0 USD/kg; in 2013 – 2015, it remained at 1.0 – 1.5 USD/kg. During this decade, the export price of China's sweet orange rose from 0.42 USD/kg to 1.48 USD/kg, with an average growth rate of 13.42%. The rising of China's sweet orange export price alleviated the sharp decline of export volume and avoided the dramatic decline in the export volume of sweet orange in recent years.

2.4 Export areas becoming centralized and the number getting shrunk In 2006 – 2015, the number of China's sweet orange export areas experienced shrinkage from expansion. With China's entry to the WTO and increase in the yield of sweet orange, the number of export countries and areas increased from 16 in 2006 to 28 in 2009. In 2010 – 2013, the number of export market remained at 22 – 25; in 2014 and 2015, the number of export market sharply shrank to 15 and 14, separately. The export market of China's sweet orange was mainly concentrated in Vietnam, Hong Kong of China, Malaysia, the Philippines and other Southeast Asian countries and the Russian Federation. According to Table 1, in 2014 – 2015, the Southeast Asian market accounted for more than 90% of China's sweet orange export. For example, in 2015, the largest export of China's sweet orange was Vietnam, the export volume was 35.01 million USD, accounting for 42.69% of total export volume of China's sweet orange, followed by Hong Kong of China, (accounting for 23.37%), and Malaysia ranked the third place.

Table 1 Export volume of main export market of China's sweet orange in 2014 – 2015

Export market		Vietnam	Hong Kong of China	Malaysia	Philippines	Thailand	Indonesia	Russian Federation
2014	Export volume//10^6 USD	33.12	36.50	17.98	9.22	2.16	2.46	4.36
	Percentage//%	30.64	33.77	16.64	8.53	2.00	2.28	4.04
2015	Export volume//10^6 USD	35.01	19.17	7.92	5.73	5.44	3.82	3.16
	Percentage//%	42.69	23.37	9.65	6.98	6.63	4.65	3.85

Note: Data source: calculated on the basis of the UN Comtrade database.

2.5 Main export provinces inconsistent with main production areas According to *China Agricultural Statistics*, China's sweet orange yield was 6.576 million tons in 2014. Jiangxi Province had the yield of 1.2937 million tons, ranking first in China and accounting for 19.67% of the total yield of China; Chongqing had the yield of 1.2215 million tons, accounting for 18.58%; Sichuan had 1.1439 million tons, Guangxi had 1.0856 million tons, Fujian had 0.2824 million tons, and Yunnan had navel orange yield of 58700 tons. Fujian and Yunnan were low in the yield of sweet orange, but they were big provinces of sweet orange export. The sweet orange yield of Fujian Province accounted for 4.29% of China's sweet orange yield, but its export volume accounted for 28.91% of the total export volume; the sweet orange yield of Yunnan Province accounted for 0.89% of China's sweet orange yield, but its export volume accounted for 22.61% of the total export volume. Guangxi and Jiangxi ranked the forefront in the export volume, but it was extremely not symmetric with their yield. Chongqing and Sichuan were large sweet orange production provinces, but their export volume was at the bottom, and the export volume of sweet orange of Sichuan Province was only 25800 USD in 2015.

Table 2 Main export provinces of China's sweet orange in 2014 – 2015

Export market		Yunnan	Fujian	Guangxi	Jiangxi	Guangdong
2014	Export volume//10^6 USD	24.44	31.25	24.30	12.88	5.47
	Percentage//%	22.61	28.91	22.48	11.91	5.06
2015	Export volume//10^6 USD	34.62	10.21	17.73	8.86	5.71
	Percentage//%	42.21	12.45	21.62	10.80	6.96

Note: Data source: calculated from data in http://www.customs-info.com.

3 Comparison of international competitiveness of export of China's sweet orange

3.1 Analysis of international market share (*IMS*) index The IMS index is the percentage of export volume of certain product in a country or region to the total export volume of this product in the world. The calculation formula is $IMS_{ij} = (X_{ij}/X_{wj}) \times 100\%$. IMS_{ij} denotes the international market share of the product j of the country i, X_{ij} denotes the export volume of the product j of the country i, and X_{wj} denotes the total export volume of the product j in the world. The higher international market share means the higher international competitiveness, and vice versa. According to Table 3, over the years, the international market share of sweet orange export of Spain ranked first in the world, its sweet orange export volume accounted for more than 25% of the world's total export volume of sweet orange, and its market share showed a gradual rising trend. The sweet orange international market share of the United States and South Africa basically remained at 12% – 15%, while the market share of Turkey remained at 3.5% – 6%. China's sweet orange occupied 1.5% – 2.5% in the international market, in 2012, the market share gradually rose, but in 2015, it declined again. On the whole,

the export percentage pattern of China's sweet orange was relatively stable and no large fluctuation appeared in 2010 – 2015.

Table 3 IMS of main sweet orange producers in the world Unit: %

Year	Spain	USA	South Africa	Egypt	Turkey	China
2010	26.94	12.02	13.39	10.64	3.44	1.85
2011	26.73	13.74	12.57	11.40	5.57	1.37
2012	27.76	14.26	12.62	9.85	4.98	1.98
2013	30.30	13.64	12.16	10.17	3.79	2.02
2014	28.47	12.62	13.50	10.02	4.31	2.45
2015	34.51	15.26	16.47	*	4.48	2.20

Note: Data source: calculated on the basis of the UN Comtrade database; * denotes data unavailable.

3.2 Analysis on trade competitiveness (*TC*) index *TC* index, also called trade specialization index, is the percentage of net export volume of certain product of a country to total import and export volume of this product in the country. It reflects the competitiveness of the country in this product compared with other exporting countries of this product. It can be expressed as $TC_{ij} = (X_{ij} - M_{ij}) / (X_{uj} + M_{ij})$. TC_{ij} denotes the trade the trade competitiveness index of the product j of the country i, X_{ij} denotes the export volume of the product j of the country i, and M_{ij} denotes the import volume of the product j of the country i. *TC* is in the range of -1 and 1, $TC > 0$, indicating that the domestic production efficiency of a certain product is higher than the international level, the higher the level, the higher the competitiveness; $TC < 0$, indicating that domestic production efficiency of a certain product is lower than the international level, the country is net importer of this product and remains weak position in the trade, and the higher the absolute value, the more prominent the weakness. This index rejects the macroeconomic factors such as economic aggregate and inflation. It has comparability in different periods and different countries. According to Table 4, the sweet orange trade competitiveness index of Egypt was always 1, indicating that Egypt's sweet orange import was very small and can be ignored. In other words, Egypt was a typical sweet orange export-oriented country and its sweet orange export competitiveness was the highest. The second was South Africa and the *TC* index was above 0.99. From 2012, the *TC* index was 1 for 3 consecutive years, indicating that the domestic production efficiency of sweet orange of South Africa was much higher than the international level, sweet orange only had high export but nearly no import. The trade competitiveness index of Turkey and Spain remained at 0.9, ranking at the third and fourth place separately. The *TC* of the United State of America was in the range of 0.5 – 0.7. The average *TC* of Egypt, South Africa, Turkey, Spain and the United States of America was higher than 0.6, indicating that these five countries had high competitiveness in export of sweet orange. China, as the third largest sweet orange producer in the world, was only second to Brazil and the United States of America, but the *TC* index of China was equal to or lower than zero (except in 2015), indicating that China's sweet orange export remained in weak position, and the competitiveness was lower than the international average level.

Table 4 The trade competitiveness (*TC*) index of main sweet orange producers in the world

Year	Spain	USA	South Africa	Egypt	Turkey	China
2010	0.83	0.64	1.00	1.00	0.90	0.05
2011	0.86	0.70	1.00	1.00	0.91	-0.25
2012	0.85	0.67	1.00	1.00	0.90	-0.09
2013	0.85	0.58	0.99	1.00	0.89	-0.04
2014	0.86	0.57	0.99	1.00	0.92	0.00
2015	0.85	0.54	0.99	*	0.89	-0.34

Note: Data source: calculated on the basis of the UN Comtrade database; * denotes data unavailable.

3.3 Analysis on the revealed comparative advantage (*RCA*) index The revealed comparative advantage (*RCA*) index refers to the ratio of the percentage of export volume of a product of a country to its total export volume to the percentage of export volume of this product to the total export volume. It is a typical index measuring whether export of a product of a country of region has comparative advantage. It can be expressed as $RCA_{ij} = [(X_{ij}/X_{tj}) / (X_{iw}/X_{tw})]$. X_{ij} denotes the export volume of the commodity i of the country j, X_{tj} denotes the total export volume of the country j, X_{iw} denotes the export volume of commodity i of the world, and X_{tw} denotes the total export volume of the world. Generally, if $RCA > 2.5$, the product of the country will have very high export competitiveness; if $1.25 \leqq RCA \leqq 2.5$, the product of the country will have high export competitiveness; if $0.8 \leqq RCA < 1.25$, the product of the country will have moderate export competitiveness; if $RCA < 0.8$, the product of the country will have low international competitiveness. According to Table 5, the *RCA* index of Egypt's sweet orange remained at absolute high value (above 60, except in 2012), indicating that Egypt had high international competitiveness in sweet orange, followed by South Africa and Spain whose *RCA* index showed a rising trend; Turkey ranked fourth with *RCA* in the range of 4 – 7; the *RCA* of the United States of America was about 1.5; China remained at the bottom and the *RCA* was lower than 0.2 all the time. On the whole, Egypt, South Africa, Spain, and Turkey had very high export competitiveness of sweet orange, the United States had high export competitiveness, and

China had very low international competitiveness of sweet orange.

Table 5 The RCA index of main planting countries of sweet orange

Year	Spain	USA	South Africa	Egypt	Turkey	China
2010	13.46	1.40	24.14	60.20	4.50	0.18
2011	16.54	1.64	20.60	63.89	7.31	0.13
2012	15.92	1.65	22.76	59.75	5.82	0.17
2013	17.57	1.60	23.62	65.28	4.61	0.17
2014	18.72	1.43	27.26	68.38	5.00	0.19
2015	19.82	1.43	33.45	*	4.40	0.14

Note: Data source: calculated on the basis of the UN Comtrade database; * denotes data unavailable.

3.4 Analysis on the revealed competitive advantage index (*CA*) index On the basis of the revealed comparative advantage, Vollratlh *et al.* designed the revealed competitive advantage (*CA*), which rejected the influence of import advantage on the *RCA* index. The *CA* index is the real competitive advantage of product from comparative advantage of export deducting the comparative advantage of import. It can be expressed as $CA_{ij} = RCA_{ij} - (M_{ij}/M_{tj})/(M_{iw}/M_{tw})$. M_{ij} denotes the export volume of the commodity i of the country j, M_{tj} denotes the total import volume of the country j, M_{iw} denotes the import volume of commodity i of the world, and M_{tw} denotes the total import volume of the world. If $CA > 0$, it indicates that the product of a country has international competitive advantage and the competitive advantage strength is proportional to the competitive advantage value. *CA* rejects the impact of the import comparative advantage, thus it more objectively measures the international competitiveness of products compared to the *TC* index and *RCA* index. According to Table 6, the results reflected by *CA* index are consistent with the analysis conclusion of *RCA* calculation results. Specifically, the sweet orange export of Egypt, South Africa, Spain, Turkey and the United States has certain competitive advantage, while China's sweet orange export is weak in international competitiveness. Summing up the above analysis, in terms of the market share, the export competitiveness of Spain is outstanding; in terms of trade competitiveness index, Egypt and South Africa have significant export competitiveness; in terms of *RCA* and *CA*, Egypt has an absolute international advantage. However, no matter using what kind of indicators, China's sweet orange export has lower international competitiveness than other five countries.

Table 6 The CA index of main planting countries of sweet orange

Year	Spain	USA	South Africa	Egypt	Turkey	China
2010	12.24	1.20	24.13	60.19	4.15	0.00
2011	15.57	1.44	20.59	63.88	7.03	-0.11
2012	14.71	1.44	22.71	59.73	5.57	-0.06
2013	16.37	1.34	23.55	65.27	4.39	-0.02
2014	17.71	1.19	27.19	68.38	4.86	-0.02
2015	18.60	1.17	33.33	*	3.99	-0.21

Note: Data source: calculated on the basis of the UN Comtrade database; * denotes data unavailable.

4 Recommendations

4.1 Fully developing the Southeast Asian market and further developing the Russian Federation market Fruit export generally follows the principle of being close to market. The nearest potential market of China's sweet orange export is mainly Southeast Asia, Mongolia, Russia, South Korea, Japan, and some countries in East Asia. At present, the export market of China's sweet orange is concentrated in Southeast Asia, but there is still space to open in Southeast Asian market. China should make full use of the ASEAN Free Trade Area, bring into play the advantage of zero tariff of sweet orange import between China and ASEAN countries, actively expand markets in Singapore, Malaysia, Indonesia and other existing Southeast Asian countries, rely on geographical advantages, and make effort to seize the Hong Kong market, which is the largest sweet orange import market in Southeast Asia. Besides, China should actively develop the Russian Federation market. The Russian Federation is the market with the highest import volume in potential sweet orange market of China. In 2015, the import volume of sweet orange in the Russian Federation reached 316 million USD. From January 1, 2016, Russia imposed restrictions on the import of agricultural products from Turkey, including prohibition against import of sweet orange from Turkey. Foreign trade enterprises of China should take advantage of the opportunity to expand the export of sweet orange to the Russian Federation market.

4.2 Diversifying varieties of sweet orange and improving the quality of sweet orange On the surface, the export of China's sweet orange is export market, the market quantity is constantly shrinking, and main export markets are small market of sweet orange. Main varieties of Chinese sweet orange are medium maturing varieties that become mature in November and December. They are too sweet and not suitable for western people, and not suitable for long time preservation. Although Guangxi, Sichuan, Jiangxi and other provinces plant early and late maturing varieties of sweet orange, the planting scale is small, and the planting varieties lack unified and scientific arrangement. China should expand the plant-

ing of early and late maturing sweet orange, and make reasonable distribution of the planting regions and varieties. To improve the quality of sweet orange, China should adopt excellent planting technique and raise the quality awareness of sweet orange farmers, so as to realize comprehensive improvement of supply chain of sweet orange, including fertilization, irrigation, pruning, pest management and picking. In line of storage, packaging, and treatment after picking, it is recommended to introduce international standards, or conduct quality management of sweet orange in accordance with international quality management standards and methods. Besides, China should improve the cold chain logistics for export of sweet orange, to ensure the quality of sweet orange during the transportation.

4.3 Reducing the production costs and improving the export competitiveness In 2014, Indonesia imported the sweet orange from Egypt at the average price of 0.77 USD/kg, the average import price from South Africa was 0.82 USD/kg, from China, the average price was 0.87 USD/kg. Considering the geographical distance of Egypt, South Africa, and China, the import price of China's sweet orange was relatively high and the quality had no advantage. As a result, Southeast Asian countries would rather import sweet orange from distant countries. In this situation, Chinese government should simplify the orchard land circulation procedure, and promote the investment of private orchard and consolidation of sweet orange planting land, to reduce the costs through expanding the planting scale. In addition, with the aging of China's population, high labor cost resulted from shortage of labor is a major problem confronted by China's fruit production. It is recommended to reduce the costs from the perspective of yield. In other words, it is required to increase the yield through improving varieties and planting technologies, and increase the economic output value of orchard through increasing the poultry breeding in orchards.

4.4 Strengthening the cooperative organization of fruit growers and bringing into play the function of bridge between fruit growers and market Chinese sweet orange growers are low in educational level and they limited ability of obtaining international market information of sweet orange. It is recommended to improve the fruit grower cooperative organizations, make them become the tie between market and fruit growers, transfer the benefit mechanism of export market to fruit growers through the fruit grower cooperatives, to improve the quality of sweet orange. American Sunkist Growers Inc. is the largest citrus cooperative with the longest history in the world. Through Sunkist Growers Inc., the planting, preservation, processing, packaging, transportation, and sales of the United States have realized integrated and professional management, and every link in the industry chain realizes smooth connection with the market. Sunkist Growers Inc. has extended the circulation channel of sweet orange, raised the commodity degree and supply and demand scale of sweet orange, and increased the economic benefits of fruit growers. Grower cooperatives should strengthen this tie and enhance the close cooperation with large foreign trade companies and packaging enterprises.

4.5 Increasing the support and changing the way and direction of supporting agriculture Government should fully extend agricultural insurance project for sweet orange (launching pilot projects in Jiangxi and Guangdong), increase the funds for premium of agricultural insurance, and establish the benefit compensation mechanism for fruit growers for losses resulted from natural disasters and insect pests. The government should take measures to prevent greening disease of citrus. Taking the year 2013 as an example, Xinfeng County of Ganzhou cleared out 5 million sick orange trees, the direct subsidy fund was up to 10 million yuan, leading to loss of the whole county up to 1.5 billion yuan. It is recommended to stick to the principle of prevention, set up "greening disease" research fund, integrate government and academic resources, and study effective greening disease treatment methods. The fruit industry bureaus of all areas should change the direction of supporting farmers, change from support for agricultural production to raise the competitiveness of local sweet orange industry, market orientation, and sustainable development ability, reduce income fluctuation of fruit growers due to various disasters or crises.

References

[1] CHEN XM. The research on international competitiveness of China's citrus export[J]. Forestry Economics, 2015, 37(1):82 - 86. (in Chinese).

[2] FENG YJ, QI CJ. The empiricial analysis on Chinese citrus' global market power[J]. Guangdong Agricultural Sciences, 2015(11):186 - 192. (in Chinese).

[3] YU YF, QI CJ. An empirical analysis on the international competitiveness of sweet orange in China[J]. Xinjiang State Farms Economy, 2007(7): 13 - 16. (in Chinese).

[4] LI ZM, ZHONG BL, SUN JB. Report on the development report of Gannan navel orange in 2013[M]. Beijing: Economic Management Publishing House, 2014: 1. (in Chinese).

[5] Egypt Citrus Annual Report[R]. USDA Foreign Agricultural Service, 2014 - 12 - 15.

[6] South Africa Citrus Supply and Demand Report[R]. USDA Foreign Agricultural Service, 2015 - 12 - 10.

[7] Turkey Citrus Annual Report[R]. USDA Foreign Agricultural Service, 2015 - 12 - 15.

[8] EU-28 Citrus Annual Report[R]. USDA Foreign Agricultural Service, 2013 - 12 - 15

[9] Citrus: World Market and Trade[R]. USDA Foreign Agricultural Service, January 2016.

[10] SHEN ZM. Opinions on the development of navel orange[J]. Fruit Growers' Friend, 2011(6):3 - 4. (in Chinese).

[11] HE J, QI CJ. Comparison and reference of the industrial development model of Chinese and foreign navel orange[J]. Economic Review, 2010 (2):110 - 113. (in Chinese).

[12] YAN XT, QI CJ. Analysis on the change of international competitiveness and export growth source of Chinese citrus since entering into WTO[J]. World Agriculture, 2013(1):71 - 76. (in Chinese).

[13] WU T, ZHANG YN. On the change of citrus industry in recent 10 years and its future[J]. Hunan Agricultural Sciences, 2013(22):1 - 4. (in Chinese).

[14] LI SL, QI CJ. A Study on the Impact and Its Countermeasure of the Free Tariff between China and ASEAN to Citrus Industry in China[J]. Around Southeast Asia, 2012(6):7 - 11. (in Chinese).

[15] ZHANG YT, LIU HM. International Competitiveness of Chinese Fresh Orange Fruit and Analysis of Its Influence Factors and Strategies[J]. World Agriculture, 2009(4):48 - 51. (in Chinese).

[16] SHEN ZM. On the advantages and gaps of citriculture in the world citriculture in China[J]. Fruit Growers' Friend, 2015(7):1 - 3. (in Chinese).