

A Critical Analysis of Cucumber and Gherkin Export Performance and Competitiveness from India

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ABSTRACT

Growth trend, export competitiveness, factors influencing the Gherkin demand from India and destination markets for Gherkins were estimated. Compound Growth rate was used to find the growth trend, Export performance ratio was used to assess the competitiveness supported by log linear type of demand function to identify the export determinants. The secondary data was collected for 28 years (1991 -2018). The annual compound growth rate increased at increasing trend for provisionally preserved (14.60 %) and preserved in ready to eat (27.80 %). In India after the establishment of Agri Export Zones (AEZ) in 2001, RCA and RSCA value for provisionally preserved and preserved in ready to eat increased. Comparing the provisionally preserved and preserved in ready to eat, export of fresh Cucumber and Gherkins was not competitive as it's RCA value is less than one and negative value for RSCA. With reference to demand for Indian Cucumber and Gherkins by log linear analysis, one per cent increase in the volume of international trade in Cucumber and Gherkins increased the demand for Indian Cucumber and Gherkins by 3.37 per cent. This indicates that the country has more scope to increase the export of Gherkins. The destination markets for fresh Cucumber and Gherkins shipped to UAE, Maldives and Nepal, provisionally preserved to France, Belgium and USA and for preserved in ready to eat USA, Netherland and Canada.

Keywords: Export, Revealed Comparative Advantage (RCA), Revealed Symmetric Comparative Advantage, (RSCA), competitiveness.

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INTRODUCTION

Gherkin cultivation was made in India during 1990 supported by focussed international demand and export oriented production in India. Gherkins consumed as a food in western countries namely USA and European countries. Gherkins are grown in contract farming with small and marginal farmers majorly in the state of Karnataka, followed by Andhra Pradesh and Tamil Nadu. The Good Agricultural Practices (GAP) followed by the farmers, processing units, standards specification adopted by the Indian gherkin manufacturers in producing very high quality Gherkins to cater world markets. Primarily processed Gherkins were exported in bulk packing of 220 litres H.D.P.E drums (High Density Poly Ethylene). After the establishment of Agri Export Zones in 2001 as per Government of India - EXIM policy, Gherkins are being exported in "Ready-to-eat Jars". The profit realization was high compared to bulk packing. During the year 2018-19 the country exported 2,12,666.27 MT of Cucumber and Gherkin to the world for the worth of 205.80 USD Millions with major destinations being USA, Belgium, Spain, France and Russia (www.apeda.gov.in).

Main objective of the study is to estimate i) Growth trend in export of Cucumber and Gherkins from both India and the World, ii) Export performance ratio of Cucumber and Gherkins using the tool revealed comparative advantage (RCA) and revealed symmetric comparative advantage (RSCA) and iii) To study the factors influencing the export of Cucumber and Gherkins products using the log linear type of demand function.

MATERIALS AND METHODS

The study was based on secondary data. The data on Indian export of Cucumber and Gherkins was collected from the APEDA website and for world level data on export of Cucumber and Gherkins was collected from the UN Com trade website for the years (1991-2018). Exchange rates of India were collected from the Reserve Bank of India (RBI) website

for 28 years (1991-2018). Total merchandise trade for World and India were collected from WTO website. Considering the fluctuation in the value of export, the performance of Cucumber and Gherkins product are worked in per cent shares of Quadrennial Ending (QE).

1. Compound Growth Rate

As suggested by Dastagiri et al. (2013), Compound growth rate was used to analyze the growth trend of export of Cucumber and Gherkins from India.

$$\ln y = a + bt \quad \dots (1)$$

Where, Y is the export of Cucumber and Gherkins,

t is the time in years,

a and b are the parameters to be estimated by Ordinary least square method.

Compound growth rate can be arrived by using the following method,

$$CGR (r) = [Anti \log(b) - 1] * 100 \quad \dots (2)$$

2. Export performance ratio

Based on the recommendation of Gibba and Alieu (2017), Export performance ratio was calculated by the following formula,

$$EPR = S_{it} / S_{wt} \quad \dots (3)$$

Where,

S_{it} = Share of Cucumber and Gherkin products in India's total exports.

S_{wt} = Share of Cucumber and Gherkin products in the World's total exports.

EPR is also called Revealed Comparative Advantage (RCA). If EPR/RCA is greater than unity, the country has comparative advantage in export of the commodity.

The RCA was made symmetric by obtaining the index as $(RCA-1/RCA+1)$. It is known as Revealed Symmetric Comparative Advantage (RSCA) and varies from -1 to +1.

3. Log linear model

Factors influencing the export of cucumber and Gherkins were identified using log linear model as suggested by Kumar et al., (2008),

$$Y = aT^{b_1}EP^{b_2}ER^{b_3}U_i \quad \dots\dots(4)$$

$$\ln Y = a + b_1T + b_2EP + b_3ER + U_i \quad \dots\dots (5)$$

Where,

Y = Export of Cucumber and Gherkin products from India (Mt)

T = World trade in cucumber and gherkin products (Mt)

EP = Gherkin price Exported from India (US\$/tonne)

ER = Exchange rate (Rs /US)

a = Intercept

b_i's = Elasticity of respective variables

U_i = Error term.

RESULT AND DISCUSSION

1. World Trade in Cucumber and Gherkins

Export of Cucumber and Gherkins across World is presented in the Table 1. Fresh

Cucumber and Gherkins are highly exported across the world. The export quantity of fresh Cucumber and Gherkins was very high (2749.17 million Tonnes in QE 2018) compared to provisionally preserved (148.16 million Tonnes) and preserved in ready to eat (520.64 million Tonnes). The reason for this variation was pickled Gherkins are highly consumed by European races and they were settled in Western countries and Australia. These countries were having high number of processing units. But, they can't produce as much as they were consuming. So the smaller countries like African and South American countries produce fresh Gherkins and export to these western countries for processing. The export quantity and value of provisionally preserved and preserved in ready to eat was low compared to fresh. But, they were constantly increasing over the period.

Table 1: Export of Cucumber and Gherkin across World, Moving average for QE 1994 to 2018.

(Quantity in million tonnes and value in million US\$)

Year	Fresh		Provisionally preserved		Preserved in ready to eat		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
QE 1994	893.67 (6.80)	581.04 (5.64)	46.69 (5.90)	24.04 (4.74)	179.61 (6.39)	158.56 (6.31)	1119.98 (100)	763.65 (100)
QE 1998	1336.19 (10.20)	845.99 (8.22)	74.67 (9.44)	41.47 (8.18)	273.06 (9.71)	228.71 (9.10)	1683.93 (100)	1116.18 (100)
QE 2002	1510.44 (11.52)	876.12 (8.52)	99.93 (12.64)	51.50 (10.17)	286.52 (10.19)	207.17 (8.24)	1896.91 (100)	1134.81 (100)
QE 2006	2026.50 (15.50)	1441.61 (14.02)	125.22 (15.84)	64.27 (12.69)	423.42 (15.06)	321.32 (12.78)	2575.15 (100)	1827.21 (100)
QE 2010	2081.39 (15.98)	1914.01 (18.61)	145.82 (18.45)	91.78 (18.12)	515.77 (18.34)	490.39 (19.51)	2742.99 (100)	2496.19 (100)
QE 2014	2514.02 (19.20)	2229.85 (21.68)	149.90 (18.97)	107.05 (21.14)	612.96 (21.79)	578.99 (23.04)	3276.89 (100)	2915.90 (100)
QE 2018	2749.17 (20.90)	2383.65 (23.18)	148.16 (18.75)	126.39 (24.95)	520.64 (18.52)	528.28 (21.02)	3417.98 (100)	3038.33 (100)

Source: Computed by author using the data from UN Comtrade.

Note: Figures within the parentheses indicate the percentages to total.

2. Export of Cucumber and Gherkins from India

Export of Cucumber and Gherkins from India is shown in the Table 2. In the International market processed product fetched more profit than fresh and Indian entrepreneurs processed fresh Gherkins into pickled product and exported in the form of provisionally preserved or preserved in ready to eat according to the importing countries specification demand. The quantity and value

of provisionally preserved increased from 2.29 million tonnes and 1.27 MUS\$ in QE 1994 to 81.71 million tonnes and 67.69 MUS\$ in QE 2018. The quantity and value of preserved in ready to eat increased from 1.09 million tonnes and 0.70 MUS\$ in QE 1994 to 122.39 million tonnes and 106.82 MUS\$ in QE 2018. The total quantity and value also increased from 3.72 million tonnes and 2.14 MUS\$ in QE 1994 to 204.62 million tonnes and 174.74 US\$ in QE 2018.

Table 2: Export of Cucumber and Gherkins from India, Moving average for QE 1994 to 2018.

(Quantity in '000' tonnes and value in million US\$)

Year	Fresh		Provisionally preserved		Preserved in ready to eat		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
QE 1994	0.34 (0.95)	0.17 (1.30)	2.29 (0.66)	1.27 (0.59)	1.09 (0.19)	0.70 (0.19)	3.72 (100)	2.14 (100)
QE 1998	7.63 (21.34)	3.13 (23.97)	18.38 (5.32)	9.73 (4.49)	4.95 (0.84)	2.80 (0.75)	30.96 (100)	15.66 (100)
QE 2002	16.22 (45.36)	5.59 (42.80)	31.19 (9.03)	13.18 (6.10)	21.69 (3.60)	9.92 (2.67)	69.10 (100)	28.69 (100)
QE 2006	8.41 (23.52)	2.89 (22.13)	63.21 (18.30)	30.41 (14.03)	103.90 (17.69)	44.88 (12.07)	175.52 (100)	78.18 (100)
QE 2010	1.59 (4.45)	0.63 (4.82)	79.18 (22.92)	45.96 (21.21)	161.00 (27.41)	88.77 (33.88)	241.77 (100)	135.36 (100)
QE 2014	1.05 (2.96)	0.32 (2.45)	69.44 (20.10)	48.58 (22.41)	172.35 (29.34)	117.76 (31.69)	242.84 (100)	166.66 (100)
QE 2018	0.52 (0.92)	0.33 (2.52)	81.71 (23.66)	67.59 (31.19)	122.39 (20.84)	106.82 (28.74)	204.62 (100)	174.74 (100)

Source: Computed by author using the data from APEDA website.

Note: Figures within the parentheses indicate the percentages to total.

3. Composition of Indian Cucumber and Gherkins with respect to World Export

The India's Composition of Fresh Cucumber and Gherkins with respect to World's export of Cucumber and Gherkins decreases continuously since the demand was only for processed Gherkins in Western countries and India has the processing units to support the processing of pickled Gherkins and export them to the needy countries. Table 3 showed the composition of India with respect to

World's Export of Cucumber and Gherkins. The percentage of fresh quantity and value decreased from 0.03 and 0.03 in QE 1994 to 0.02 and 0.02 in QE 2018. The percentage of provisionally preserved quantity and value increased from 3.48 and 3.85 in QE 1994 to 55.48 and 53.14 in QE 2018. The percentage of preserved in ready to eat quantity and value increased from 0.49 and 0.36 in QE 1994 to 23.77 and 20.29 in QE 2018.

Table 3. Composition of India with respect to World's Export of Cucumber and Gherkins

(In per cent)

Year	Fresh		Provisionally preserved		Preserved in ready to eat		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
QE 1994	0.03	0.03	3.48	03.85	00.49	0.36	00.27	0.24
QE 1998	0.57	0.38	24.00	22.60	01.77	01.23	01.82	1.43
QE 2002	1.06	0.63	31.19	25.95	07.43	04.81	03.61	2.50
QE 2006	0.47	0.23	48.46	45.12	23.97	13.73	07.14	4.18
QE 2010	0.08	0.03	54.15	49.37	31.16	17.93	08.78	5.41
QE 2014	0.04	0.02	45.99	44.73	28.26	20.39	07.45	5.72
QE 2018	0.02	0.02	55.48	53.14	23.77	20.29	06.01	5.74

Source: Computed by author using the data from APEDA and UN COMTRADE websites.

4. Compound Growth rate of Cucumber and Gherkins Exports from India and World

The compound growth rate for India's fresh Cucumber and Gherkins quantity was non-significant and negative (Table 4). The India's CGR for both provisionally preserved and

preserved in ready to eat quantities was 14.50 per cent and 27.80 per cent which was significant and positive. The World's compound growth rate for all the three forms of Cucumber and Gherkins quantity was positive and significant.

Table 4: Compound Growth rate of Cucumber and Gherkins Exports quantity from India and World (1991 – 2018)

(Per cent)

Contents	Fresh Cucumber & Gherkins		Provisionally Preserved		Preserved in ready to eat	
	India	World	India	World	India	World
Quantity	-2.22 ^{NS}	4.70**	14.60*	5.00**	27.80*	4.75**

Source: Computed by author using the data from APEDA and UN COMTRADE websites
NS - Not significant,** - Significant at 1 per cent level, * - Significant at 5 per cent level.

The compound growth rate for India's fresh Cucumber and Gherkins value was non-significant and negative (Table 5). The India's CGR for both provisionally preserved and preserved in ready to eat values was 16.38 per

cent and 29.28 per cent which was significant and positive. The World's compound growth rate for all three forms of Cucumber and Gherkins value was positive and significant.

Table 5: Compound Growth rate of Cucumber and Gherkins Exports value from India and World (1991 – 2018)

Contents	(Per cent)					
	Fresh Cucumber & Gherkins		Provisionally Preserved		Preserved in ready eat	
	India	World	India	World	India	World
Value	-1.69 ^{NS}	6.68**	16.38*	7.34**	29.28*	6.46**

Source: Computed by author using the data from APEDA and UN COMTRADE websites.

NS - Not significant, ** - Significant at 1 per cent level, * - Significant at 5 per cent level.

5. Export Performance Ratio:

Export performance Ratio was analysed as before and after the implementation of Agri Export Zone which was introduced in 2001

through EXIM policy (1997-2001) through which eight districts of Karnataka and seven districts of Andhra Pradesh was announced as Agri Export Zones of Cucumber and Gherkins.

Table 6: Export Performance Ratio

Contents	Fresh Cucumber and Gherkins		Provisionally preserved		Preserved in ready to eat	
	1991 – 2001	2002-2018	1991 – 2001	2002 –2018	1991-2001	2002-2018
	Before AEZ	After AEZ	Before AEZ	After AEZ	Before AEZ	After AEZ
RCA	9.1×10 ⁻⁷	7.1×10 ⁻⁷	25.01	39.2	3.2	15.5
RSCA	-0.99	-0.99	0.7	0.9	0.2	0.85

Source: Computed by author using the data from APEDA, UN COMTRADE and RBI websites.

RCA – Revealed comparative advantage **RSCA** – Revealed symmetric comparative advantage.

Export performance ratio was shown in Table 6. The RCA for India's Fresh Cucumber and Gherkins was less than one for both before and after the AEZ. The RSCA was also negative. It indicated that fresh Cucumber and Gherkins was not comparatively competitive for export. The RCA and RSCA for provisionally preserved was 25.01 and 0.7 before AEZ and 39.2 and 0.9 after AEZ. The RCA and RSCA for preserved in ready to eat was 3.2 and 0.2

before AEZ and 15.5 and 0.85 after AEZ and it showed that EXIM policy plays a significant role in increase in the export of Cucumber and Gherkins products.

6. Log Linear Demand Model

The empirical model for the factors influencing the export of Cucumber and Gherkins was

$$\ln y = -26.67 + 3.37 T + 1.12ER + 1.14EP + U_i$$

Where,

Table 7: Results of Log linear model

Items	Coefficients
Constant	-26.67**
Volume of International trade in cucumber and Gherkin (Mt) (T)	3.37**
Exchange rate (Rs/US\$)	1.12 ^{NS}
India export price (US\$/Mt)	1.14*
R ²	0.86

NS - Not significant, ** - Significant at one per cent level, * - Significant at five per cent level.

Source: Author's Calculation (2019)

All the variables had a positive impact (Table 7). One per cent increase in the volume of International trade in Cucumber and Gherkins increased the demand for India's Cucumber and Gherkins by 3.37 percentage. Though the

exchange rate was non-significant, it had positive impact on dependent variable. The Indian export price also had positive impact. Hence, the India has more scope for export of its Gherkins product to other countries.

Table 8: Major destination for export of Cucumbers and Gherkin products from India

Country	2016-17		2017-18		2018 -19	
	Qty Tonnes	US\$ Thousand	Qty Tonnes	US\$ Thousand	Qty Tonnes	US\$ Thousand
Fresh Cucumber and Gherkins						
United Arab Emirates	441.47	225.62	323.20	192.33	358.46	248.83
Maldives	0.84	0.79	9.07	8.82	20.61	22.07
Nepal	23.31	4.77	31.02	5.23	35.06	19.39
Provisionally preserved Cucumber and Gherkins						
France	9806.59	8.48	12420.36	12.55	14561.34	15.30
Belgium	8854.24	9.20	12042.68	14.33	11223.80	13.08
U S A	12850.73	10.16	15619.68	13.16	10878.16	9.04
Preserved ready to eat Cucumber and gherkins						
U S A	19793.07	18.95	24789.89	24.67	26699.00	30.29
Netherland	7071.56	5.22	8535.02	7.19	11292.05	14.63
Canada	8601.43	9.37	10764.27	10.75	11258.44	12.32

Source: APEDA @ <http://apeda.com/TradeJunction/Statistics/India>.

Fresh Cucumber and Gherkins was majorly exported to United Arab Emirates as it has more demand in their country especially for the purpose of regulating their body temperature (table 8). The provisionally preserved was majorly exported to France, Belgium and USA. The preserved ready to eat was exported to USA, Netherland and Canada.

SUMMARY AND CONCLUSION

India is slowly becoming the pioneer country in the export of processed Cucumber and Gherkins with its share of 55.18 per cent for provisionally preserved and 23.71 per cent for preserved ready to eat. After 2014, due to international trade restriction on Russia due its annexation of Crimea, India lost its huge market for preserved ready to eat.

Due to continuous cultivation of the same crop, pest and disease infestation became predominant which makes frequent crop failure for the farmers cultivating Gherkin crop. Hence, the government can encourage the agricultural universities to make research and help the farmers by reducing the pest and disease infestations of the crop.

The processing units may advise the farmers to go for crop rotation and not force them to cultivate continuously the same crop. India may continue to export Fresh Cucumber and Gherkins to United Arab Emirates where the demand is high and the processed Gherkins to USA, Russia, Australia and European Countries. Like Gherkins, the International demand for other processed crops may be identified, so that India may become dominant

in the export and Indian farmers may get high benefits from these crops.

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