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Research Note

Export of Cucumber and Gherkin from India: Performance, Destinations, Competitiveness and Determinants

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Abstract

The performance, competitiveness, major destinations and determinants of cucumber and gherkin export from India have been studied. Export performance ratio has been used to estimate the competitiveness, and log linear type of demand function has been used to determine the export determinants. It has been observed that India has made tremendous progress in the export of cucumber and gherkin products during the past 15 years (1990-2005). The export has increased by about 128.5-times with an impressive annual compound growth rate of 37.46 per cent, as against only 4.38 per cent in the world market. The major export destinations for cucumber and gherkin have been identified as France, USA, Russia, Belgium and Spain. An increasing and high value of revealed comparative advantage (RCA) and a positive and increasing value for revealed symmetric comparative advantage (RSCA) have indicated high potential in their export, particularly for the provisionally-preserved and prepared/preserved products. One per cent increase in volume of international trade in cucumber and gherkin may increase the demand from India by 5.96 per cent. This indicates that India is highly competitive in export of cucumber and gherkin and has ample scope to further increase its export. The study has also revealed that exchange rate is a more dominant determinant of export from India than price of commodity.

Introduction

Although India is a traditional producer of cucumber, its export potential was discovered during the late-1980s, and since then their exports have been increasing progressively. When the cost of production of gherkins in the Europe became too high, their production shifted to Turkey. Later, Turkish farmers found tomato-growing to be more profitable and shifted to tomato production (Anonymous, 2007). Farmers in India seized upon this opportunity to produce gherkins. The production of gherkins in India is concentrated in the three southern states, viz. Karnataka, Tamil Nadu and Andhra Pradesh. Karnataka accounts for almost 60 per cent of the total gherkin production and Tamil Nadu and Andhra Pradesh account for 20 per cent each (Anonymous, 2005). It is not palatable with Indian taste, but is a major dietary constituent to many European countries and the USA. Hence, almost the entire volume of gherkin produced in India is exported, with little or no domestic demand, except for some five star hotels (Acharya, 2006).

In the emerging trade scenario, cost and quality of a commodity determine the flow and dynamics of its trade in the world market. India with favourable agro-climatic conditions and surplus labour has the potential to produce high-quality gherkin round the year and has the capacity to export it to the international market. Gherkin satisfies all the criteria described by Vyas (1994) for the export-orientation, viz. a genuine and growing surplus after meeting domestic requirements, favourable ratio of export

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to domestic price, and growing international demand. The Govt. of India has rightly identified the export potential of this commodity and has established Agri-Export Zones (AEZs) for the crop in the states of Karnataka and Andhra Pradesh.

Keeping in view the vast export potential in of cucumber and gherkin, it is pertinent to analyse their export performance and identify factors affecting it. There is also concern about the impact of trade liberalization on the export performance of agricultural commodities. This paper has discussed some of these issues with following specific objectives: (i) Export performance and competitiveness of cucumber and gherkin from India, (ii) Major destinations of Indian cucumber and gherkin products, and (iii) Identification of the determinants of cucumber and gherkin export from India.

Methodology

Time-series data on the export of cucumber and gherkin products for India and world were obtained from FAO Trade Yearbook as well as export statistics of APEDA and Commodity Trade Statistics of UNO by visiting their respective websites. The values of export and imports have been referred in US dollars to net out the effect of changes in exchange rate. To study the performance and composition of exports of different products of cucumber and gherkin, per cent shares were worked out on triennium basis, considering the problems of wide fluctuations in the value of export and imports. The Export Performance Ratio (EPR) was estimated to examine the comparative advantage of India in the export of cucumber and gherkin products, following the method suggested by Balassa (1965), using Equation (1):

$$EPR = S_{it} / S_{wt} \quad \ldots(1)$$

where,

S_{it} = Share of cucumber and gherkin products in India's total export, and

S_{wt} = Share of cucumber and gherkin products in the total world exports.

Since EPR is based on the observed pattern of trade flows, it is also called Revealed Comparative Advantage (RCA). If EPR/RCA is greater than unity, the country has comparative advantage in export of the commodity. As suggested by Laursen (1998), RCA was made symmetric by obtaining the index as (RCA-1/RCA+1). This index is known as Revealed Symmetric Comparative Advantage (RSCA) and varies from -1 to +1. The annual compound growth rate (ACGR) for India vis-à-vis world was computed to examine the trends in export of cucumber and gherkin products.

Factors influencing the export of cucumber and gherkin products were identified using the log linear type of demand function, as used by Shende and Bhole (1999) and Kumar (2004) [Equation 2]:

$$Y = a\, T^{b_1} (EP)^{b_2} (ER)^{b_3} U_i \quad \ldots(2)$$

where,

Y = India's export of cucumber and gherkin products (Mt)

T = Total international trade in cucumber and gherkin products (Mt)

EP = Indian export price of gherkin products (US$/tonne)

ER = Exchange rate (Rs/US$)

a = Intercept

b_is = Elasticity of respective variables, and

U_i = Random- error terms, $u_i \sim N (0, ?^2_{ui})$

Indian export prices and international prices for gherkin products have been represented by their respective unit values. The unit value of Indian export was derived from the data on quantity and value of gherkin products export available in the FAO Trade Yearbook and Commodity Trade Statistics of UNO. The historical exchange rate data were obtained from the website of Reserve Bank of India, Government of India. The regression analysis was carried out for a time span of 15 years (1991-2005), using the ordinary least squares (OLS) method.

Results and Discussion

Production and Trade Performance

Composition of Cucumber and Gherkin Export

India has been exporting cucumber since long, though in small quantities and irregularly. The

gherkin exports from India are of recent origin. The exports of major products of cucumber and gherkin from 1991 to 2005, in quantitative and value terms, have been presented in Table 1.

Indian exports in cucumber and gherkin were categorized as 'fresh', 'prepared/ preserved' and 'provisionally preserved'. The export of cucumber and gherkin products has increased from an average of 1.21 thousand tonnes in triennium ending (TE) 1993 to 155.46 thousand tonnes in TE 2005; and in value terms, from US$ 0.73 million to US $ 66.37 million. The export in all the three categories of cucumber and gherkin, except the 'fresh' category has consistently increased. In the case of 'fresh' category, export increased from 0.10 thousand tonnes during TE1993 to 18.98 thousand tonnes during TE 2002 but declined to 10.88 thousand tonnes per annum during TE 2005. The decline in export of 'fresh' category may be attributed to the increase in export of 'preserved or provisionally-preserved' category due to better profit realization in the processed products. It is also evident from the fact that unit value realization from export of 'fresh' cucumber and gherkin declined from Rs17.02/kg during 2002 to Rs13.64/kg during 2005.

Exports in 'prepared/preserved' have registered the highest growth during the period 1991 to 2005. In physical terms, the export increased 375.6-times, from 0.24 thousand tonnes during TE 1993 to 90.14 thousand tonnes during TE 2005. The 'provisionally-preserved' category dominated the export basket from TE 1993 to TE 2002. During TE 2005, 'prepared/preserved' category emerged as the largest contributor to exports with 58 per cent share, followed by 'provisionally-preserved' (35%) and 'fresh' (7%) categories. Thus, export from India has increased more rapidly of the processed products. However, the declining trends in unit value realization from the exports of all the products from US$ 662.64/t during TE1993 to US$ 421.5/t during TE 2005 indicate the falling profit margins from their export. It may be due to the fact that after India's entry into the international market during 1980s, there was a big increase in the supply side, which led to a decline in the prices of these commodities. Also, even after implementation of Agreement on Agriculture (AOA) under the aegis of WTO, developed countries are maintaining large support to their agriculture by taking the advantage of complex categorization of support in exempt categories (Chand and Phillip, 2001). In this regard, it has been shown that the recent level of support to agriculture by OECD countries in most cases was higher than what it was during the base year 1986-88 and 1998-2000 (Chand, 2002; NAAS, 2006).

Table 1. Composition of export of cucumber and gherkin from India, average for TE 1993 to 2005

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

Year	Fresh		Prepared/ preserved		Provisionally preserved		Total		Unit value
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	(US$/tonne)
TE 1993	0.10	0.04	0.24	0.22	0.88	0.47	1.21	0.73	662.6
	(7.9)	(5.1)	(19.5)	(29.8)	(72.5)	(64.7)	(100.0)	(100.0)	
TE 1996	5.24	2.22	2.96	1.72	11.29	5.88	19.49	9.82	520.0
	(26.9)	(22.6)	(15.2)	(17.6)	(57.9)	(59.9)	(100.0)	(100.0)	
TE 1999	7.96	3.30	8.19	4.42	23.82	12.40	39.97	20.12	505.5
	(19.9)	(16.4)	(20.5)	(21.9)	(59.6)	(61.6)	(100.0)	(100.0)	
TE 2002	18.98	6.38	25.60	11.69	33.16	13.82	77.74	31.89	420.7
	(24.4)	(20.0)	(32.9)	(36.6)	(42.6)	(43.3)	(100.0)	(100.0)	
TE 2005	10.88	3.65	90.14	37.81	54.44	24.92	155.46	66.37	421.5
	(7.0)	(5.5)	(57.9)	(56.9)	(35.0)	(37.5)	(100.0)	(100.0)	

Source: Based on APEDA (http://apeda.com/TradeJunction/Statistics/Indian)

Note: Figures within the parentheses indicate the percentages to total

Growth Rate in Export of Cucumber and Gherkin

The annual compound growth rates (ACGR) for production and export of cucumber and gherkin for India and the world pertaining to the period 1991-2005 have been presented in Table 2. The production of cucumber and gherkin has increased at the per annum rate of 0.97 per cent in India and 6.32 per cent for the world. Similarly, growth in area and yield has also increased, though at a slower rate in India than the world.

India has registered a significant ACGR in the export of all the three categories of cucumber and gherkin products in comparison to the world. In the case of 'fresh' cucumber and gherkin, India has achieved an ACGR of 33.37 per cent in physical terms and 30.85 per cent in value terms, whereas export growth in the world was of only 3.13 per cent in physical and 4.25 per cent in value terms. Among all the three categories of cucumber and gherkin, the preserved category had registered the highest ACGR of 48.17 per cent in physical and 43.76 per cent in value terms, followed by provisionally-preserved category. The unit value of export in all the three categories had registered a significantly negative growth rate of 3.7 per cent per annum on overall basis, while for the world it had increased by 0.37 per cent per annum, though it is non-significant. This indicates that value realization has been decreasing for India and increasing for the world. It may be due to the better quality of products in other countries which fetch higher prices in the international markets.

India's Share in World Trade of Selected Cucumber and Gherkin Products

Share of India in the world export of these commodities during different years has been presented in Table 3. In the total export of all the three products of cucumber and gherkin, India's share in world export had increased from 0.09 per cent in TE 1993 to 6.69 per cent in TE 2005 in quantitative terms but increase in value terms was not impressive, from 0.08 per cent during TE 1993 to 3.79 per cent during TE 2005. India had improved her share remarkably in the export of provisionally-preserved and prepared/preserved categories of cucumber and

Table 2. Annual compound growth rate in trade of cucumber and gherkin: 1991-2005

Particulars	India		World	
	Quantitative-terms	Value-terms	Quantitative-terms	Value-terms
Area	0.87**		5.43**	
Production	0.97**		6.32**	
Export of fresh cucumber and gherkin				
Export	33.37**	30.85**	3.13**	4.25**
Unit value		-3.07**		1.12
Export of prepared/ preserved cucumber and gherkin				
Export	48.17**	43.76**	8.64**	6.05**
Unit value		-4.9**		-2.59**
Export of provisionally- preserved cucumber and gherkin				
Export	26.96**	24.95**	10.09**	9.19**
Unit value		-2.02*		-0.89*
Total export of cucumber and gherkin				
Export	37.46**	33.74**	4.38**	4.75**
Unit value		-3.70**		0.37

Note: * and ** indicate significance at 5 per cent and 1per cent levels of significance, respectively.

Source: Constructed from data of (1) FAO (2007) @ faostat.fao.org
(2) APEDA @ http://apeda.com/TradeJunction/Statistics/India and
(3) http://comtrade.un.org/db/mr/daCommodities.aspx

Table 3. Share of India in world export of cucumber and gherkin: 1991-2005

(in per cent)

Year	Fresh		Prepared/ preserved		Provisionally-preserved		Total	
(in TE)	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity
1993	0.01	0.01	0.24	0.23	0.93	0.93	0.08	0.09
1996	0.29	0.41	0.78	1.15	8.49	8.77	0.91	1.16
1999	0.44	0.60	2.07	3.01	13.33	13.90	1.88	2.25
2002	0.74	1.30	5.76	8.32	13.58	15.89	2.76	3.95
2005	0.29	0.68	12.50	20.68	20.40	22.53	3.79	6.69

Source: Constructed from data of (1) FAO (2007) @ faostat.fao.org
(2) APEDA @ http://apeda.com/TradeJunction/Statistics/India and
(3) http://comtrade.un.org/db/mr/daCommodities.aspx

gherkin, in TE 1993 to 2005. Due to this high growth, India emerged as the largest exporter of these two products in the world in quantitative terms and 3rd largest, after Germany and Turkey, in the case of prepared/preserved category of cucumber and gherkin. It may be due to the better quality of these products. Hence, quality improvement needs a major emphasis in Indian products for fetching higher prices. A mixed trend was observed in the case of fresh cucumber and gherkin, whose share first increased from 0.01 per cent during TE 1993 to 1.3 per cent during TE 2002 and then declined to 0.68 per cent during TE 2005. It may be due to less availability of fresh cucumber and gherkin due to rise in demand of their provisionally-preserved and prepared products from India. Thus, it is required that India should increase the production of cucumber and gherkin to seize upon their fast expanding world market. At present we are exporting almost entire quantity of gherkin production.

Destinations of Indian Cucumber and Gherkin

Difference in comparative advantage, geographical and political proximity and degree of trade barriers are the major determinants of destinations for exports of any food commody. The country-wise share in the world exports of cucumber and gherkin products for the period TE 2005-06 have been presented in Table 4. France, USA, Belgium, Spain and Netherlands have been the major importers of fresh cucumber and gherkin from India and their cumulative share was about 61 per cent of total Indian export of cucumber and gherkin. France has been the single largest importer of fresh cucumber and gherkin from India with a share of 21 per cent, followed by USA (14%), Spain (10.7%), Netherlands (8.5 %) and Belgium (7%), in quantitative terms. France has also been the largest importer of provisionally-preserved cucumber and gherkin during TE 2005-06 from India in value terms with a share of 19.9 per cent, followed by USA (19.39%), Russia (8.61%), Belgium (2.61%) and Spain (1.03%). However in quantitative terms, Russia was the biggest importer of provisionally-preserved cucumber and gherkin, followed by Russia, France, Spain and Belgium. These five countries jointly contributed about 78 per cent share in quantitative terms and 81.5 per cent in value terms of total share of provisionally-preserved cucumber and gherkin export from India. Other important destinations were Estonia, Australia, Netherlands, Canada, Italy and UK.

For prepared/preserved cucumber and gherkin, Russia was the single largest exporter with about 46.0 per cent share in quantitative terms and 40.7 per cent share in value terms. The share of Russia was higher than those of USA, France, Belgium and Spain taken together in both value and quantitative terms. The cumulative shares of these five countries, in export of prepared/preserved cucumber and gherkin from India were 78.24 per cent in quantitative and 77.34 per cent in value terms. Other important destinations for it were Netherlands, Australia, Estonia, Canada and Germany.

In terms of value realization of our exports, Belgium and France provided a better price for our

Table 4. Major destinations for export of cucumbers and gherkin products from India

(Quantity in '000 tones and value in million Rs)

Rank	Country	2003-04		Percentage to total		Average of TE 2005-06		Percentage of total	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
				Fresh cucumber and gherkin					
1	France	5	81.2	21.1	20.5	2.3	34.6	20.9	20.6
2	USA	3.5	59.9	14.6	15.1	1.5	24.4	14.1	14.5
3	Belgium	1.7	44.1	7.1	11.1	0.8	18.5	7.0	11
4	Spain	2.8	41.8	11.6	10.5	1.2	16.6	10.7	9.9
5	Netherland	2.1	39.2	8.6	9.9	0.9	15.1	8.5	9.0
6	Other countries	8.8	130.3	37.1	32.9	4.1	58.6	38.8	35.0
	Total	23.9	396.5	100.1	100	10.8	167.8	100	100
				Provisionally-preserved cucumber and gherkin					
1	France	7.6	158.3	22	23.1	8.8	222.8	16.1	19.9
2	USA	8.2	153	23.8	22.3	11.1	216.9	20.5	19.4
3	Russia	2.1	36.6	6.1	5.3	11.9	208.2	22.0	18.6
4	Belgium	3.3	102.9	9.5	15.0	4.4	141	8.1	12.6
5	Spain	3.5	62.4	10.1	9.1	6.2	123.4	11.3	11.0
6	Other countries	9.7	173.3	28.5	25.2	12.0	206.5	22.0	18.5
	Total	34.4	686.5	100	100	54.4	1118.8	100	100
				Prepared/preserved cucumber/gherkin					
1	Russia	14.7	222.7	23.3	18.6	41.2	689.1	45.9	40.7
2	USA	10.6	198.1	16.8	16.5	11.8	239.4	13.1	14.1
3	France	9.1	178.0	14.5	14.9	7.2	151.4	8.0	8.9
4	Belgium	3.9	111.7	6.3	9.3	5.0	127.3	5.5	7.5
5	Spain	6.7	132.6	10.6	11.1	5.2	102.5	5.8	6.1
6	Other countries	18	353.7	28.5	29.6	19.4	383.5	21.7	22.7
	Total	63	1196.8	100	100	89.8	1693.2	100	100

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

cucumber and gherkin (Table 5). Therefore, there is a need to direct more of our export to these countries to get a higher price of our agri-products.

France does not produce cucumber and gherkin, but is a large importer of small cucumber and gherkin or 'Cornichons', which they relish. Hungary, India and Mexico are the main supplier-countries. Cornichons are in big demand and command a higher price due to their exclusive hand-harvesting and gourmet value (Anonymous, 2005). India has a definite advantage in this field because of its enormous human labour resource. It should take appropriate steps to increase export of cucumber and gherkin, particularly Cornichons, to these markets.

International Competitiveness

In the liberalized and globalized trade regime, countries having export competitiveness in the commodity will only survive in the long-term and shall harvest the benefits of trade. Therefore, to ascertain the competitiveness of India in trade of cucumber and gherkin revealed comparative advantages (RCAs) and revealed symmetric comparative advantages (RSCAs) were estimated for different products of cucumber and gherkin and have been presented in Table 6.

The results have indicated that India has been highly competitive in the export of provisionally-preserved and prepared/preserved categories of

Table 5. Per unit value realization from export of total ('fresh', 'prepared/ preserved' and 'provisionally-preserved' products of cucumber and gherkin) to five major countries

(Quantity in '000 tones and value in million Rs)

Sl No.	Country	Total export (total of 'fresh', 'prepared/ preserved' and 'provisionally-preserved')		Per unit value realization (Rs/kg)
		Quantity	Value	
1	France	18.3	408.8	22.34
2	USA	24.4	480.7	19.70
3	Russia	54	912.4	16.90
4	Belgium	10.2	286.8	28.12
5	Spain	12.6	242.5	19.25
6	Others	35.5	648.6	18.27
7	Total	155	2979.8	19.22

Table 6. Revealed comparative advantage (RCA) and revealed symmetric comparative advantage (RSCA) for cucumber and gherkin:1991-2005

Year	Fresh		Provisionally-preserved		Prepared / preserved		Total	
	RCA	RSCA	RCA	RSCA	RCA	RSCA	RCA	RSCA
1991	0.01	-0.98	0.00	-1.00	1.23	0.10	0.15	-0.75
1995	0.33	-0.50	14.09	0.87	0.75	-0.14	1.19	0.09
2000	0.48	-0.35	17.62	0.89	9.70	0.81	3.61	0.57
2001	1.12	0.05	15.48	0.88	5.96	0.71	3.36	0.54
2002	1.31	0.13	20.46	0.91	7.30	0.76	3.93	0.59
2003	0.92	-0.04	20.14	0.91	12.25	0.85	4.04	0.60
2004	0.19	-0.68	24.17	0.92	11.78	0.84	3.70	0.57
2005	0.04	-0.93	33.54	0.94	23.69	0.92	6.75	0.74

Source: Constructed from data of (1) FAO (2007) @ faostat.fao.org
(2) APEDA @ http://apeda.com/TradeJunction/Statistics/India and
(3) http://comtrade.un.org/db/mr/daCommodities.aspx

cucumber and gherkin and this competitiveness has been increasing continuously with the passage of time. However, the results for fresh cucumber and gherkin have shown a mixed trend with comparative advantage in the years 2001 and 2002 only. In all other years, the values for RCAs are less than unity and negative for RSCAs. Thus, India should concentrate more on exporting of processed cucumber and gherkin. Dev and Rao (2005) have reported that farmers get more profit from cultivation of cucumber and gherkin than other crops. Moreover, these crops being labour-intensive, could increase employment opportunities to family labour as well as to other labourers in the area. Therefore, export of preserved cucumber and gherkin will enhance labour absorption in our labour-surplus country.

Determinants of Export of Cucumber and Gherkin from India

In order to identify the factors affecting the export of cucumber and gherkin from India, regression analysis was performed. On the basis of best fit, log linear form was selected and the results have been presented in Table 7. The three basic determinants, viz. world market size, exchange rate, and Indian export price, could together explain 96 per cent of the total variation in export of cucumber and gherkin from India. The coefficients for all the variables, except Indian export price were found highly significant.

The estimate for international trade volume has shown that for 1 per cent increase in the world trade

Table 7. Estimates of export demand model for Indian cucumber and gherkins

Items	Coefficients	Standard error
Constant	-56.402***	9.411
Volume of international trade in cucumber and gherkin (Mt)	5.961***	1.190
Exchange rate (Rs/US$)	3.048**	1.177
Indian export price (US$/Mt)	0.644	0.795
R^2	96.40	0.3846
F value	98.199***	

Note: ** and *** indicate level of significance at 5 per cent and per cent levels, respectively.

Source: Constructed from data of (1) FAO (2007) @ faostat.fao.org
(2) APEDA @ http://apeda.com/TradeJunction/Statistics/India and
(3) http://comtrade.un.org/db/mr/daCommodities.aspx

in cucumber and gherkin products, demand for them from India will increase by 5.96 per cent. The coefficient for exchange rate was positive and significant and indicated the importance of proper management in the export of cucumber and gherkin products from India.

Indian export price had a positive effect on the demand for export of cucumber and gherkin products from India, It is against the economic logic but is non-significant and hence it can be concluded that export price has not played any significant role in influencing the export of cucumber gherkin from India.

Conclusions

The study has revealed that India is highly competitive in the export of cucumber and gherkin and its products, which have registered an impressive growth during the recent years. However, price realization of Indian products has declined during the period. This trend needs to be checked by improving the quality of these products through dissemination of improved techniques of production and processing and also by providing adequate government support for making production and marketing of these products more economical. Establishment of infrastructure for various sanitary and phytosanitary measures will also help in better price realization of Indian cucumber and gherkin in the international market. Gherkin is a short-duration (75-90 days) labour-intensive and highly profitable crop and therefore, its cultivation should be expanded to enhance its export in the world market. The study has also revealed that exchange rate is a more dominant determinant of export from India than price of commodity.

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