

EXPORT PERFORMANCE OF CASTOR OIL FROM INDIA

*MANDAN, M. B.

PG INSTITUTE OF AGRI-BUSINESS MANAGEMENT
JUNAGADH AGRICULTURAL UNIVERSITY
JUNAGADH – 362 001, GUJARAT, INDIA

**EMAIL: mandanmadhu@gmail.com*

ABSTRACT

India is the world's largest producer and exporter of castor seed oil and exports around 80 per cent of its total castor oil production. (Nominal Protection Coefficient) NPC model was used to find out export performance and Markov Chain Model was used to find out change in direction of castor oil export from India. Seven year's (2008-09 to 2014-15) castor oil export data (country wise) of India was used to find out the change in trade direction. The export of castor oil from India was moderate competitive during the year 2014-15. In general out of 40 castor oil importing countries, 22 were found moderate profitable (Indonesia (0.62) followed by Ghana (0.65), Bangladesh (0.67), Nigeria (0.67) etc., while other 18 countries were less competitive (Mexico (0.76) followed by Philippines (0.76), Brazil (0.76), Egypt (0.77) etc. The export of castor oil was not highly competitive and non-competitive in any country as any country's NPC value was not less than 0.5 and not more than one. China was one of the most stable markets among the major importers of castor oil as reflected by the probability of retention at 66.67 per cent of its market share from one period to the next period. France, USA and Japan recorded moderate level of retention probability of 42.86 per cent. Netherland and Thailand retained 28.57 per cent of its previous market share.

KEY WORDS: *Castor oil, Export, Markov Chain Model Nominal Protection Coefficient*

INTRODUCTION

Oilseeds crops have been one of the significant contributors of the Indian agricultural economy next to food grains in terms of area and production. The Indian climate is suitable for the cultivation of oilseed crops; therefore, large varieties of oilseeds are cultivated here.

Castor (*Ricinus communis* L.) is one of the ancient and important non edible oilseed crop. It is a perennial crop but grown as an annual for economic purpose. It is cultivated mostly in the arid and semiarid regions in the world. The crop duration is 4-5 months. In India, it is sown in July or

August and harvesting commences around December or January. Castor is an important industrial non-edible oilseed crop. Castor seed contains 45-48 per cent non-edible oil, which is used as domestic, medicinal and industrial purpose (Gowri Shanker, 2013).

India accounts for nearly 79 per cent of world's castor area and 80 per cent of world castor production and ranks first in both area and production in the world followed by Brazil and China in the year 2015-16. China is the highest in yield of castor in world followed by India and Thailand. Being a monopoly castor producer, India has also virtual monopoly

position in castor oil exports, too. In 2015-16, India accounted for 91.73 per cent of total global castor oil exports, against nearly 89.5 per cent in 2010-11. Gujarat, Rajasthan, Andhra Pradesh and Telengana contribute about 98 per cent of the total castor seeds production in India. Gujarat is number one castor producing state with share of about 80 per cent of the total India's castor seed production. Present study may helpful to traders for knowing castor oil's prominent role and its share in international trade. It may also helpful to producers and policy makers of castor oil for future planning. The trade direction enables to identify the stable market for castor oil trade which may help to frame company level export policy. The objectives of the study were as follows:

- To analyze the export performance of castor oil.
- To study the change in direction of castor oil export from India.

METHODOLOGY

Data collection

Secondary data regarding exports of castor oil over a period of time were collected from websites (www.apeda.gov.in, www.iopepc.in). Seven year's (2008-09 to 2014-15) castor oil export data (country wise) of India was used to find out the change in trade direction. NPC of castor oil was calculated for the year of 2014-15.

Nominal Protection Coefficient

NPC was computed to determine the extent of competitive advantages enjoyed by the commodities in the context of free trade. The co-efficient had light and whether a country has comparative advantages in the export of that commodity in a free trade scenario or not. NPC is defined as the ratio of domestic price and world reference price (Rajur and Patil, 2013).

$$NPC = P_d / P_r$$

Where,

NPC = Nominal Protection Coefficient

P^d = Domestic price of the castor oil

P^r = World reference price of castor oil

The decision criterion is, if NPC is less than one then the commodity is competitive. If NPC is greater than one commodity is not competitive not a good import substitute or not worth exporting.

The domestic price is normally the wholesale market price of commodity in the selected market. The reference price is the international price adjusted for transfer cost, marketing and trading margin including the processing charges necessary to make the commodity.

If ($NPC < 0.5$) it indicate highly competitive ones, ($0.5 < NPC < 0.75$) moderately competitive, ($0.75 < NPC \leq 1$) less competitive and if $NPC > 1$, then the castor oil is protected or non-competitive.

Markov Chain Analysis

To analyze the structural change in export was examine by using the Markov-Chain Approach. In this study, the dynamic nature of trade patterns that was the gains and losses in export of castor oil in major importing countries was examine using the Markov Chain model. Markov chain analysis involves developing a transitional probability matrix 'P', whose elements, P_{ij} indicate the probability of exports switching from country 'i' to country 'j' over time (Rajur and Patil, 2013).

In the context of this study, six major importing countries of castor oil were considered. The average exports to a particular country was consider to be a random variable which depends only on the past exports to that country, which can be denoted algebraically as,

$$E_{jt} = \sum_{i=1}^n (E_{i,t-1})P_{ij} + e_{jt}$$

Where,

E_{jt} = Exports from India to j^{th} country during the year t .

$E_{i,t-1}$ = Exports to i^{th} country during the period $t-1$.

P_{ij} = Probability that the exports will shift

from i^{th} country to j^{th} country.
 T = Number of years considered for the analysis.

R = Number of importing countries.

The transitional probabilities P_{ij} which can be arranged in a $(c \times r)$ matrix have the following properties.

$$\sum_{i=1}^n P_{ij} = 1 \wedge 0 \leq P_{ji} \leq 1 \quad (3)$$

Transitional probability matrix

Min, $OP^* + I e$

Subjected to,

$$XP^* + V = Y$$

$$GP^* = 1$$

$$P^* \geq 0$$

Where,

P^* = Vector of the probabilities P_{ij}

O = Vector of zeros

I = An appropriately dimensional vectors of areas

e = The vector of absolute errors

Y = The proportion of exports to each country.

X = A block diagonal matrix of lagged values of Y

V = The vector of errors

G = Grouping matrix to add the row elements of P arranged in P^* to unity.

RESULTS AND DISCUSSION

Export performance

The results depicted in Table 1 revealed the country wise NPC values for castor oil export from India. It clearly shows that export of castor oil was not highly competitive in any country as any country's NPC value was not less than 0.5. The moderate profitable countries (NPC less than 0.75) were Indonesia (0.62) followed by Ghana (0.65), Bangladesh (0.67), Nigeria (0.67) up to Iraq (0.75). The less competitive countries ($0.75 < NPC \leq 1$) were Mexico (0.76) followed by Philippines (0.76), Brazil (0.76), Egypt (0.77) up to France (0.86). NPC values for

any countries were not more than one. So, any country was not non competitive.

Overall, analysis shows that for most of countries, export of castor oil from India was moderate competitive during the year 2014-15. In general out of 40 castor oil importing countries 22 were found moderate profitable while other 18 countries were less competitive.

Change in direction of castor oil export

The Transitional Probability Matrix presented in Table 2 provides a broad indication of changes in the direction of export of castor oil from India for the study period (2008-09 to 2014-15). The major Indian castor oil importing countries were China, France, Netherland, USA, Japan and Thailand and all other importing countries were grouped under the category of the other countries.

The row elements for a particular country indicate the probability of losing the market share by that country to competitive importers. The column elements for a country indicate the probability of gains to that country from other importers in terms of market shares. The main diagonal elements show the retention of market share by the corresponding country and an indicator of loyalty of that country to Indian exports.

China was one of the most stable markets among the major importers of castor oil as reflected by the probability of retention at 66.67 per cent of its market share from one period to the next period. It lost its market share to other countries and Netherland to the extent of 16.67 per cent. It also gained from the Netherland to the extent of 14.29 per cent and 28.57 per cent from others.

France, USA and Japan recorded moderate level of retention probability of 42.86 per cent. France gained 28.57 per cent market share from Netherland and 14.29 per cent market share from USA and other countries. It lost its 14.29 per cent market

share to Netherland and USA. USA gained 14.29 per cent market share from France, Netherland, Thailand and others while it lost mainly to Netherland (28.57%) and somewhat to France and others (14.29 %). Japan gained 57.14 per cent from Thailand but it lost same to Thailand.

Netherland and Thailand retained 28.57 per cent of its previous market share. Netherland gained 16.67, 14.29, 28.57, and 14.29 per cent market share from China, France, USA and others respectively. It lost 14.29 per cent market share to China, USA and others after losing 28.50 per cent to France. Thailand gained higher market share from Japan (57.14 %) and low from others (14.29 %). It lost same market share to Japan (57.14 %) and 14.29 per cent to USA.

Thus, on the basis of analysis of transitional probability matrix we can classify the major Indian castor oil export market into stable market (China) and moderate stable market (France, USA, Japan, Thailand and Netherland). Improvement the production technology and meeting the quality needs of importing countries would help in stabilizing the castor oil export.

CONCLUSION

China was one of the most stable markets among the major importers of castor oil. Majority castor oil importing countries were found moderate profitable and less competitive. There is scope to, make moderate competitive countries to highly competitive by decreasing cost of packaging handling, through providing technical support for high quality standards assurance and export subsidy incentives. There is immense potential for export of castor oil. Therefore lot of focus may be paid towards improving the quality of the produce in order to receive good price and widen the market. There is need for large scale improvement in processing, value addition, grading, packaging, storage, and market infrastructure.

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Table 1: County wise analysis of castor oil export from India and NPC values

Countries	Quantity(MT)	Value(Rs.Lakh)	UnitValue(Rs./Kg.)	ReferencePrice(Pb)	NPC(Pd/Pb)
Indonesia	341.6	388.81	113.820	112.220	0.628
Ghana	357.45	389.88	109.073	107.473	0.656
Bangladesh	56.43	60.37	106.982	105.382	0.669
Nigeria	278	296.02	106.482	104.882	0.672
Hong Kong	264.08	274.62	103.991	102.391	0.689
Canada	310.66	317.31	102.141	100.541	0.701
Germany	1921.55	1962.07	102.109	100.509	0.701
Kuwait	725.27	738.56	101.832	100.232	0.703
Kenya	119.5	121.18	101.406	99.806	0.706
Iran	1152.4	1164.33	101.035	99.435	0.709
Australia	1629.32	1641.29	100.735	99.135	0.711
Singapore	1518.07	1490.27	98.169	96.569	0.730
South	2822.52	2757.79	97.707	96.107	0.734
Jordan	395.7	386.28	97.619	96.019	0.734
Taiwan	2311.05	2248.28	97.284	95.684	0.737
Nepal	137.87	134.04	97.222	95.622	0.737
Saudi Arab	1317.49	1278.26	97.022	95.422	0.739
Argentina	711	687.32	96.669	95.069	0.742
Greece	167.4	161.03	96.195	94.595	0.745
Colombia	234	224.55	95.962	94.362	0.747
Spain	1465	1398.59	95.467	93.867	0.751
Iraq	102.87	97.31	94.595	92.995	0.758
Mexico	2655.84	2490.87	93.788	92.188	0.765
Philippines	233.8	218.1	93.285	91.685	0.769
Brazil	1543.67	1439.16	93.230	91.630	0.769
Egypt	1463.03	1353.72	92.529	90.929	0.775
Russia	3546.5	3278.78	92.451	90.851	0.776
Belgium	7500	6929.48	92.393	90.793	0.776
Turkey	7420.3	6840.4	92.185	90.585	0.778
Korea	7965.26	7337.49	92.119	90.519	0.779
Italy	4895.61	4494.5	91.807	90.207	0.782
Israel	856.6	779.77	91.031	89.431	0.788
Japan	22198.52	20159.58	90.815	89.215	0.790
UK	8565.44	7576.44	88.454	86.854	0.812
USA	64906.86	57317.98	88.308	86.708	0.813
Netherland	89746.63	77170.69	85.987	84.387	0.835
Thailand	20822.38	17475.42	83.926	82.326	0.856
China	157362.27	131604.36	83.631	82.031	0.859
Malaysia	50589.96	42228.27	83.472	81.872	0.861
France	68618.88	57038.23	83.123	81.523	0.865

Wholesale price (Pd) =70.5 per kg.,

Packing and handling cost=1.6 per kg.

Table 2: Transitional probability matrix of Indian castor oil export

Countries	China	France	Netherland	U S A	Japan	Thailand	Others
China	0.6667	0.0000	0.1667	0.0000	0.0000	0.0000	0.1667
France	0.0000	0.4286	0.1429	0.1429	0.0000	0.0000	0.2857
Netherland	0.1429	0.2857	0.2857	0.1429	0.0000	0.0000	0.1429
U S A	0.0000	0.1429	0.2857	0.4286	0.0000	0.0000	0.1429
Japan	0.0000	0.0000	0.0000	0.0000	0.4286	0.5714	0.0000
Thailand	0.0000	0.0000	0.0000	0.1429	0.5714	0.2857	0.0000
Others	0.2857	0.1429	0.1429	0.1429	0.0000	0.1429	0.1429

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