RESEARCH ARTICLE Bhartiya Krishi Anusandhan Patrika, Volume 37 Issue 2: 144-150 (June 2022)

The Trade Competitiveness of Indian Processed Cheese

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ABSTRACT

Background: The study focuses on India's trade competitiveness in Cheese and Curd (HS 0406)'. It also gives a global overview of the dairy industry. Over the last two decades, the exports of Indian dairy products have increased tremendously. Milk oil products, cheese and curd, as well as milk powder exports, are the key contributions. Although India's contribution in global dairy exports is modest, milk oil products, as well as cheese and curd, have seen significant growth in the previous two decades. This study analyses the growth in exports of Indian Processed Cheese over the last two decades and examines the competitiveness and comparative analysis of Indian trade in this product.

Methods: All the data were collected during 2019-2020. This study is based on secondary data from the ITC Trade Map for the years 2001 through 2020 and the main tools used to analyze the data were the Linear Growth Model, Instability Index, Unit Price Analysis, Protection Coefficient (NPC) and Comparative Analysis (RCA and RSCA).

Result: The key findings reflect on the growth, market share, instability, market competitiveness and comparative analysis of the 'Processed Cheese' (HS 040630)'. The findings of the studies concluded that the trade of 'Processed Cheese' from India has increased significantly over the last two decades, even though its share of Indian exports remains minimal. Over the last two decades, both the volume of trade and the unit price received per unit for 'Processed Cheese' has increased significantly. The NPC, RCA and RSCA analysis revealed that the product was neither competitive nor it is showing comparative advantage for most of the period of consideration.

Key words: Compounded annual growth rate, Harmonized system, Processed cheese.

INTRODUCTION

Global milk production increased 2.0 per cent from 2019 to over 906 million tons in 2020, owing to rises in all geographical regions except Africa, where production remained steady Haddad *et al.,* (2022). Asia saw the highest rise in milk volume (Patel, 1998), followed by Europe, the Americas, Oceania and Central and South America and the Caribbean. Milk production in Asia increased by 2.6 per cent year on year to 379 million tons in 2020, owing primarily to increases in India, China, Pakistan and Turkey. Kazakhstan, Uzbekistan and Japan all saw moderate increases in production. In India, milk production increased by 2.0 per cent from 2019 to 195 million tons in 2020 FAO, (2021).

International dairy trade increased by 1.2 per cent to nearly 79 million tons (milk equivalent) in 2020. The marginal increase in international dairy trade reflected increased sales of WMP, whey powder, cheese and all other dairy products more than compensating reductions in exports of SMP and milk fat and oil. Exports of cheese expanded by almost 1 per cent to 6 million tons in 2020.

Majority of cheese was exported by some European countries namely, Germany, Italy, France and some other countries like the Netherlands and the United States of America, while import of cheese was recorded by some countries namely, Germany, United Kingdom, France, Italy and Belgium. Overall, the import of cheese was higher than that of export at global level from past three years. Leading cheese exporters such as Germany, the Netherlands, the United States of America and Ireland saw a boost in exports because of higher cheese imports. Cheese prices rose as well, particularly in the first half of 2019, due to seasonally limited export availability from Oceania and the European Union, as well as significant import demand from Asia. Cheese prices began to fall in June 2019 as worldwide export availability improved FAO, (2020).

In terms of dairy commodities, 'milk and cream-neither concentrated nor sweetened HS-0401','milk and cream-concentrated or sweetened HS-0402', 'Buttermilk and other fermented milk HS-0403', 'Whey products HS-0404','milk fats and oil products-HS 0405' and 'cheese and curd HS-0406' are the six commodities traded globally. In 2020, global dairy exports declined to 79.93 billion USD, a 1.48 per cent decrease from FY 2019 and a significant drop compared to

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How to cite this article: Prajapati, D.M., Kumar, V., Dave, K.D. and Jagalan, V. (2022). The Trade Competitiveness of Indian Processed Cheese. Bhartiya Krishi Anusandhan Patrika. 37(2): 144-150. DOI: 10.18805/BKAP480.

Submitted: 04-03-2022 **Accepted:** 16-05-2022 **Online:** 28-05-2022

the 0.24 per cent increase in FY2019. Fig 1 shows the change in the share of individual dairy commodity trade in the global dairy trade from 2001 to 2020. Over the last two decades, the contribution of commodities like 'milk and cream-neither concentrated nor sweetened HS-0401','Whey products HS-0404', 'milk fats and oil products-HS 0405' and cheese and curd HS-0406' to global dairy trade has increased moderately, while the contribution of 'milk and cream-concentrated or sweetened HS-0402' has gradually decreased. Contribution of 'Buttermilk and other fermented milk HS-0403' commodity in global dairy trade has remained stagnant. The major exporters of these dairy commodities are Germany, France, the Netherlands, Ireland, Belgium, New Zealand and the United States of America, while the top importers are China, the United Arab Emirates, Saudi Arabia, the United States, France, Germany, the Netherlands and Russia ITC Trade Map, (2021).

Along with the global market for Cheese and Curd (HS-0406), the Indian export market for the same has developed dramatically over the last two decades. India is one of the biggest exporters of 'Cheese and Curd' worldwide. Germany, France, the Netherlands, Italy and the United States are key exporters of milk fat and oil, while Germany, the United Kingdom, France, Belgium and Italy are notable importers (ITC Trade Map, 2021). This research paper examines the global trends and growth in the HS-0406 and HS-040630category trade from India. It also analyzes the market competitiveness and comparative analysis of products exported under the HS-0406 and HS-040630, *i.e.*, cheese and curd and processed cheese, respectively.

MATERIALS AND METHODS

Secondary time series data from the International Trade Centre-Trade Map was collected from 2001 to 2020. For 'Processed Cheese (ITC HS Code - 040630),' data on export volumes, export value, market share of different countries, unit price and export price were collected at the domestic and international level.

The data was analyzed using the compound annual growth rate, the Instability index, the nominal protection coefficient and revealed comparative analysis.

CAGR (Cumulative annual growth rate)

The data so collected was analyzed on the time series analysis and the cumulative annual growth rates were calculated to observe the growth trend of dairy commodities between 2001 and 2019. The form of the function used is Parihar, (2015):

$$\gamma = \alpha\beta t$$

The logarithmic transformation was used to convert this into a linear function, which was displayed as:

$$\text{Log } \gamma = \log \alpha + t \log \beta$$

Where,

γ = Dependent variable.

t = Independent variable (time in year).

The compound annual growth rate was then calculated using the following formulae:

$$\text{CAGR} = (\text{Antilog b } -1) \times 100$$

The ordinary least square approach was then used to estimate this equation.

Instability index

The simple co-efficient of variation (CV) typically includes the trend component in time series data with long-term trends, overestimating the extent of instability. The Cuddy Della Valle Index will be used to fix the CV using the formula to overcome this difficulty Cuddy, (1978).

$$\text{Instability index (II)} = \text{CV} \times \sqrt{(1-R^2)}$$

Where,

CV= Co-efficient of variation.

R^2 = Co-efficient of determination.

Nominal protection coefficient (NPC)

While the competitiveness of any commodity can be measured in various ways, NPC happens to be one of the popular measures. The NPC estimate is correct because it reflects the difference between domestic and international/

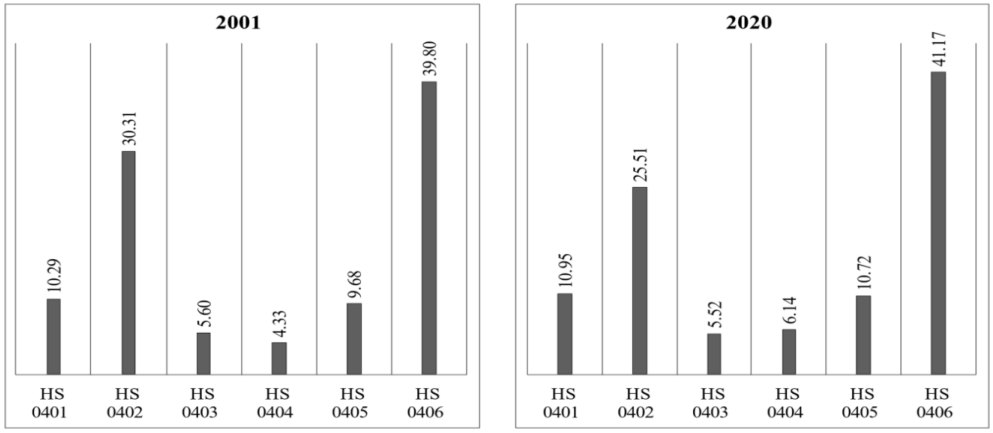

Fig 1: Global dairy commodity trade comparison over past two decades.
(Source: ITC Trade Map, 2021).

border equivalent prices and so explains the amount of commodity protection in a country. The prevalence of market interventions such as taxes, subsidies and other policy tools was the primary cause of this discrepancy. The following equation is used to calculate NPC:

$$NPC_i = \frac{P_{id} \times ER}{P_{ib}}$$

Where

NPC_i: The nominal protection coefficient of the i^{th} commodity.

P_{id} : Domestic price in domestic currency.

P_{ib} : Border price in foreign currency.

ER: Exchange rate.

The domestic wholesale price cannot be considered as the export price, even though it may not accurately reflect a commodity's level of competitiveness. As a result, the current research compares India's unit price of exports (*i.e.*, export value/export quantity) to the global unit rate. Both prices are in US dollars and are freight on board (fob) pricing, indicating that the exporter bears the expense of transportation Parida *et al.,* (2021). Thus:

$$NPC = \frac{\text{India's export price}}{\text{World export price}}$$

Unit export prices were calculated as the following:

$$\text{Export price (USD/ton)} = \frac{\text{Export values}}{\text{Export quantity}}$$

If the NPC ratio is less than one, the country boasts a competitive advantage in those commodities, as well as additional export incentives. As a result, the commodity is unprotected. In other words, producers are taxed and consumers subsidized. If the NPC ratio is greater than one, the export is discouraged because it lacks a competitive advantage. Because the price of such a commodity is believed to be lower under free trade, the government is protecting it. In other words, producers are subsidized and consumers are taxed Khorajiya *et al.* (2018) and Parida *et al.* (2021).

Revealed comparative advantage (RCA)

The RCA is a ratio that compares a country's share of worldwide exports to its share of exports of a specific commodity. If a country's RCA is greater than one, it has an advantage; if it is less than one, it has a disadvantage.

Government interventions, import restrictions, subsidies and tariffs, as well as internal and foreign trade policies, have an impact on the ratio (Serin and Ciyan, 2008). Although a disadvantage may not accurately reflect comparable status, it does imply that trade policies are not favorable to the commodity's export. Determine a country's relative advantage or disadvantage in a certain class of products or services as evidenced by trade flows (Balassa, 1965).

$$RCA = \frac{(X_{ij} / X_{wj})}{(X_i / X_w)}$$

X_{ij} = 'i' th country's export of commodity 'j'.

X_{wj} = World export of commodity 'j'.

X_i = Total exports of country 'i'.

X_w = Total world export.

(Note: Country 'i' refers to India, commodity 'j' refers to any of the selected processed food item).

Revealed symmetric comparative advantage

The RSCA is an off shoot of the RCA. If RSCA is less than zero, the commodity has an export disadvantage; if RSCA is more than zero, the commodity has an export advantage.

Unit price analysis

From thecalculation of NPC, the unit prices for globally traded cheese product (HS-040630) as well as the cheese products traded from India were calculated for the previous two decades. Indian unit prices for the product are compared to the global unit price of cheese over the last two decades. This will broadly reflect whether the Indian Processed Cheese trade is competitive or not.

RESULTS AND DISCUSSION

Cheese trade: Global scenario (ITC HS Code-0406)

'Cheese' sales witnessed a significant rise in the global exports in the year 2020 for the countries like Germany, the Netherlands, the United States of America and Ireland, while,

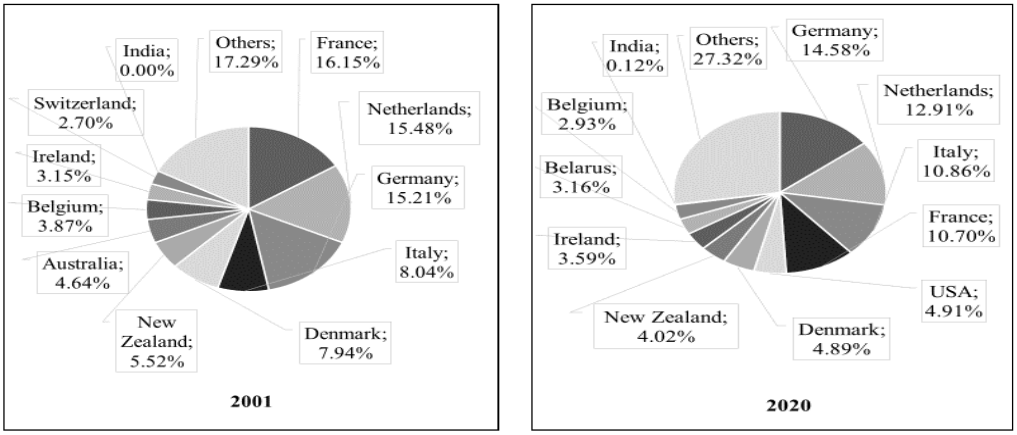

Fig 2: Global cheese trade scenario.
(Source: ITC Trade Map, 2021).

the exports declined in the case of some countries like Italy, France, Denmark, *etc*. As shown, in Fig 2 below Germany remained the largest exporter of the commodity, contributing a share of near about 15 per cent, followed by the Netherlands, Ireland, Germany and Belgium in the year 2020. Import of 'Milk Fat and Oil' commodities by France, Germany, Netherlands and China was marked a noticeable growth, on the other hand, imports to Belgium, United Kingdom, Italy and Saudi Arabia, among others, declined in the year 2020. As shown in Fig 2 below France and Germany remained the largest importing country for HS 0405 commodities with a share of 12 per cent in global imports followed by Netherlands, Russian Federation and China. In value terms, the European countries only, contributed up to 49.27 per cent imports of total global imports ITC Trade Map-2021).

Cheese trade: Indian scenario

Indian trade of products under the category of 'Cheese and Curd (ITC HS Code - 0406)' accounted for 39,393 thousand USD with the export of 8,050tons quantity globally in the year 2020. The commodity trade accounted for 0.12 per cent of global 'Cheese and Curd (ITC HS Code - 0406)' trade while its contribution to the Indian dairy commodity trade remained 21.94 per cent in the year 2020. Table 1 below describes the various products traded under this broad category. It can be depicted from Table 1 that, In the year 2020, the commodity 'Cheese (excluding fresh cheese, incl. whey cheese, curd, processed cheese, blue-veined cheese) (ITC HS Code-040690)' contributed the most to the product category trade with trade worth of 24,875 thousand USD, followed by the products 'Processed cheese, not grated or powdered (ITC HS Code-040630)' and 'Fresh cheese "unripened or uncured cheese" (ITC HS Code-040610)' with trade worth of 13,439 thousand USD and 954 thousand USD, respectively.

Trade scenario: Processed cheese (HS Code - 040630)

Fig 3 focuses on the developments that have occurred in the processed cheese industry during the last two decades. In 2001, France led the world in processed cheese trade, followed by Germany, Belgium, Australia and Denmark. In short, the share of European countries in the processed cheese trade alone was 53.90 per cent, which has risen to 1.01 per cent in 2020. In the year 2020, Germany is the leading country with the largest share of processed export earnings, followed by France, Saudi Arab, Belgium and Austria. The highest growth in the top ten countries in terms of growth in processed cheese exports over the past two decades is in Germany, Saudi Arab, Austria, New Zealand and Netherlands, respectively. India's share of processed cheese exports increased from 0.004 per cent in 2001 to

Table 1: List of products exported under HS Code-0406.

ITC HS code 4 Digit	ITC HS code 6 Digit	Product description	Value of export FY 2020 ('000 USD)
0406(100)	040610	Fresh cheese "un-ripened or uncured cheese"	954 (2.42)
	040620	Grated or powdered cheese, of all kinds	125 (0.32)
	040630	Processed cheese, not grated or powdered	13439 (34.12)
	040640	Blue-veined cheese and other cheese containing veins produced by "*Penicillium roqueforti*"	0 (0.0)
	040690	Cheese (excluding fresh cheese, incl. whey cheese, curd, processed cheese, blue-veined cheese)	24875 (63.15)

Note: Values shown in the parenthesis are the per centage of the total value.
(Source: ITC Trade Map, 2021).

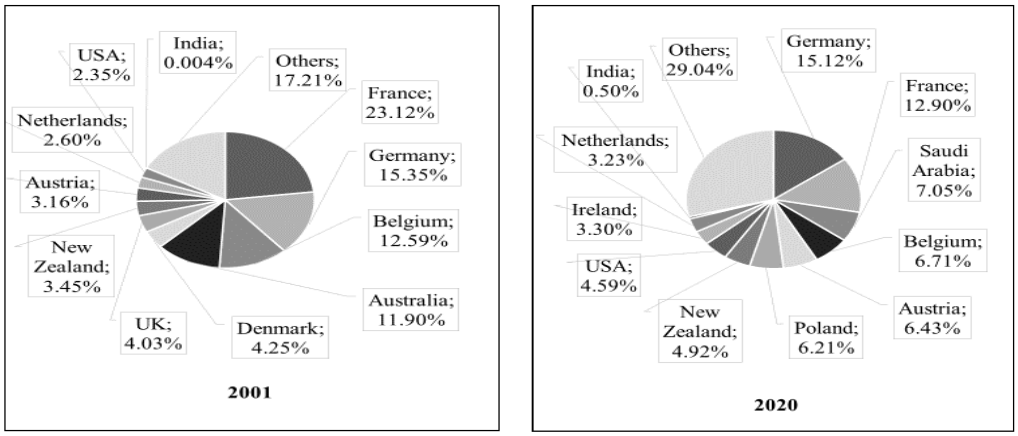

Fig 3: Global processed cheese - HS 040630 trade comparison over past two decades.
(Source: ITC Trade Map, 2021).

0.50 per cent in 2020. India's processed cheese export hasdeclined by 1 per cent from the previous year ITC Trade Map, (2021).

Growth in Indian processed cheese trade

Fig 4 shows the trend in export ofprocessed cheese from India over the previous two decades. It can be seen that the export of processed cheese was modest in the early decade from 2001 to 2006, but then significant surges and growth in values can be observed in the business of processed cheese until the year 2008, after which the export of processed cheese witnessed a decline till the year 2017. Again in 2018 and 2019, the export increased significantly and declined in 2020 possibly due to the effect of the covid-pandemic. Overall, the value of processed cheese has witnessed a higher growth when compared to exported quantity ITC Trade Map, (2021).

Growth and instability analysis

As shown in Table 2 below, India's trade in 'Processed Cheese (ITC HS Code-040630)' for the last two decades shows a significant growth trend. Table 2 shows that processed cheese trade has grown positively, with a 34.53 per cent increase in traded volume and a 41.29 per cent increase in export value over the period under review.

Table 2: Growth and instability analysis for processed cheese.

	Processed cheese export (HS Code 40630)	
Years	Q (Tons)	V ('000 USD)
2001	28	44
2002	8	21
2003	2	7
2004	26	67
2005	101	246
2006	69	196
2007	683	2504
2008	1473	7050
2009	915	2747
2010	659	3242
2011	665	2363
2012	933	3127
2013	1016	3903
2014	1076	4723
2015	874	4067
2016	987	4475
2017	1642	8942
2018	3071	16573
2019	2614	13602
2020	2185	13439
CAGR	34.53**	41.29**
II	49.88	52.41

Note: *Indicates Significant at 5% level, **Indicates significant at 1% level, NS= Non-Significant.

(Source: ITC Trade Map, 2021).

The Instability analysis for the period shows that the volume and value of processed cheese trade remained stable, with an Instability Index value of 49.88 and 52.41, respectively. This also indicates lesser fluctuating nature of unit price of processed cheese received over the period of the review period for a unit quantity traded.

Competitiveness analysis

Table 3 shows that the NPC value for processed cheese (ITC HS Code-040630) ranges from 0.53 to 1.447 across the study period. This indicates that, during the past two decades, the Indian processed cheese trade is export competitiveness with the value of NPC below unity for the majority period under the period of consideration. From 2001 to 2010, the processed cheese trade from India was competitive except for the years 2003 and 2010. In contrast, during the next decade, from 2011 to 2020, the trade from India for processed cheese was not competitive for most of the time period, except for the years 2011, 2012, 2013 and 2014. The NPC value above unity as observed in Table 3 implies that the product in the discussion was traded at much higher rates than the world price, undermining its market competitiveness Ohlan, (2012), Parida *et al* and (2021). Similarly, RCA values are less than unity, while RSCA values are negative for the considered period of time, indicating that the is not having comparative advantage in the export.

Unit price analysis

For the majority period of the analysis, the price received against a unit quantity of processed cheese traded from

Table 3: Competitive analysis of processed cheese exported from India.

	Competitive analysis for processed cheese		
	RCA	RSCA	NPC
2001	0.005	-0.990	0.530
2002	0.002	-0.996	0.865
2003	0.001	-0.999	1.057
2004	0.005	-0.990	0.719
2005	0.015	-0.971	0.653
2006	0.011	-0.979	0.752
2007	0.112	-0.799	0.889
2008	0.251	-0.599	0.926
2009	0.087	-0.840	0.657
2010	0.093	-0.830	1.126
2011	0.052	-0.901	0.724
2012	0.075	-0.860	0.695
2013	0.072	-0.865	0.754
2014	0.093	-0.829	0.864
2015	0.109	-0.803	1.138
2016	0.121	-0.784	1.193
2017	0.202	-0.664	1.289
2018	0.353	-0.479	1.221
2019	0.287	-0.554	1.230
2020	0.316	-0.520	1.447

(Source: ITC Trade Map, 2021).

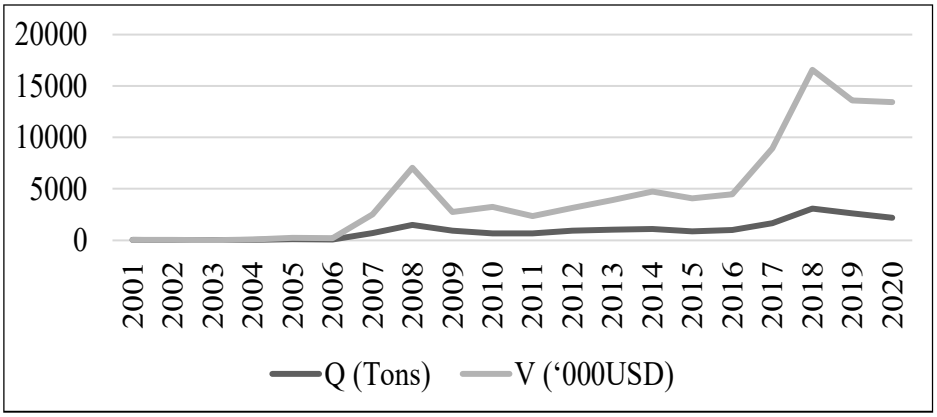

Fig 4: Indian processed cheese trade scenario.
(Source: ITC Trade Map, 2021).

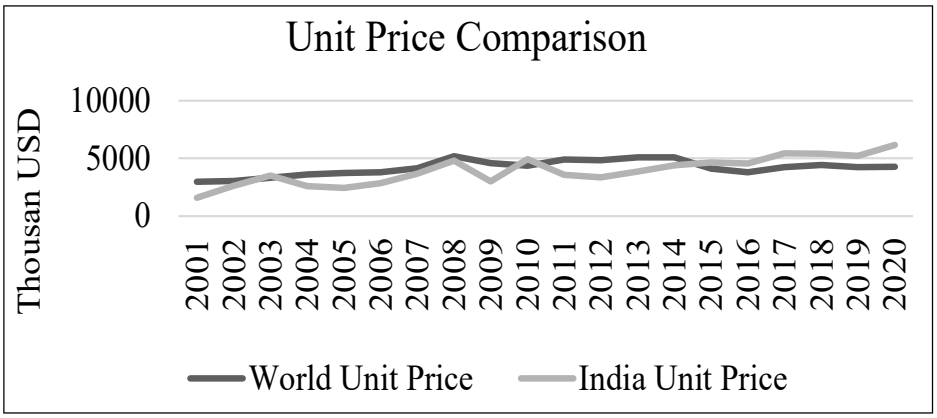

Fig 5: Unit price analysis of processed cheese.
(Source: ITC Trade Map, 2021).

India was significantly low when compared to the international reference price for the same commodity. Only in the years 2003, 2010 and 2015 to 2020 can the competitive character of Indian processed cheese pricing be seen in Fig 5; otherwise, the non-competitive nature of Indian processed cheese prices can be seen.

CONCLUSION

From the above findings of the study, it can be concluded that the trade of 'Processed Cheese' from India has increased significantly over the last two decades, even though its share of Indian exports remains minimal. Over the last two decades, both the volume of trade and the unit price received per unit for 'Processed Cheese' (ITC HS Code - 040630) has increased significantly. Trade for HS 0406 commodities remained stable over the period of analysis. The NPC, RCA and RSCA analysis revealed that the product was neither competitive nor it is showing comparative advantage for most of the period of consideration. One of the reasons could be that, in order to keep the dairy market export-oriented, government subsidies for dairy product manufacturing and trade in the European Union and the United States make their product available at a lower price than the Indian commodity rates for the same hindering the competitiveness of the Indian dairy commodity.

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