

India

Underweight (no change)

Highlighted Companies

Camlin Fine Sciences

ADD, TP Rs225, Rs193 close

The company's EPS witnessed a 21.6% CAGR due to backward integration, and revenue grew by a 12.6% CAGR over FY21-24F, resulting in a higher EBITDA margin.

Jubilant Ingrevia Ltd

ADD, TP Rs780, Rs793 close

We remain bullish on the company for its diversified product portfolio, volume growth and improving return ratios.

Navin Fluorine International Ltd

HOLD, TP Rs3476, Rs3918 close

We value the company at 36x year-ending Aug 2023F EPS to arrive at our TP.

Summary Valuation Metrics

P/E (x)	Mar21-F	Mar22-F	Mar23-F
Camlin Fine Sciences	46.63	28.21	21.14
Jubilant Ingrevia Ltd	39.87	28.17	27.28
Navin Fluorine International Ltd	78.47	64.53	51.7

P/BV (x)	Mar21-F	Mar22-F	Mar23-F
Camlin Fine Sciences	3.82	3.41	2.98
Jubilant Ingrevia Ltd	6.57	5.05	4.04
Navin Fluorine International Ltd	11.87	10.23	8.72

Dividend Yield	Mar21-F	Mar22-F	Mar23-F
Camlin Fine Sciences	0.22%	0.41%	0.53%
Jubilant Ingrevia Ltd	0.05%	0.15%	0.18%
Navin Fluorine International Ltd	0.15%	0.2%	0.25%

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Chemicals - Overall

Import substitution is a very big opportunity

- While equity market is abuzz with China+1 opportunity in global supply chain, we believe that substituting Chinese imports in India is a bigger opportunity.
- India's overall organic chemical exports are ~4% of global trade and at the same time, India's imports from China account for ~2.5% of global trade.
- Integrating themselves to local supply chains is the biggest opportunity for Indian companies, but for that they need to start incurring capex now.

Rather than China+1, substituting imports is a very big opportunity

Almost all listed companies in the chemical space fall under the broad category of organic chemicals. Global exports in this category stood at ~US\$380bn in CY20, out of which India accounted for US\$17bn. However, India already runs a positive trade balance with RoW (ex-China). Can India further increase its exports to RoW? It's possible, but a much easier way is to replace Chinese products in Indian market. India runs a big trade deficit with China in some big sub-segments of heterocyclic chemicals with nitrogen hetero atoms etc. Usage of these chemicals indicates that a supplier can easily be changed. We have analysed 11 such sub-sectors where Indian companies can potentially replace imports from China. We have identified the likely beneficiaries as well in case of shifting of these supply chains. However, as per our estimates, apart from amine manufacturers, Jubilant for pyridines and to some extent SRF/Aarti Industries, nobody else in the listed space stand to benefit. Please note that this analysis is for organic chemicals which covers most of the listed chemical manufacturing companies.

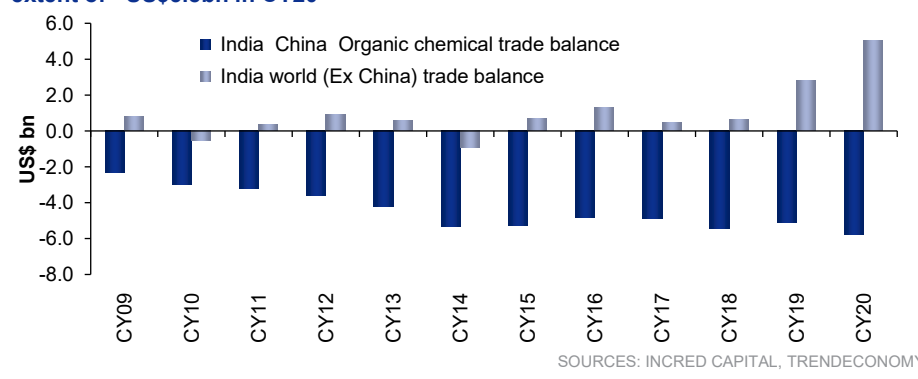
Indian companies can easily substitute imports of some chemicals

Indian companies can replace Chinese imports in some sub-classes like 1) heterocyclic compounds with nitrogen hetero-atom, 2) Oxygen-function amino compounds, 3) amine-function compounds, 4) unsaturated acyclic monocarboxylic acids, 5) carboxylic acids with additional oxygen function, 6) saturated acyclic monocarboxylic acids and their derivatives, 7) halogenated derivatives of hydrocarbons, 8) heterocyclic compounds with oxygen hetero-atom, 9) ketones and quinones, and 10) heterocyclic compounds with oxygen hetero-atom. The combined imports from China in these 10 sub-categories are ~US\$4.4bn. Please note that India runs an US\$3.9bn trade deficit in these 10 categories vis-à-vis China.

Who can benefit from replacing China?

We have analysed 11 sub-sections of organic chemicals and find that most of the listed companies aren't likely to benefit in the immediate future. We are sure that when relatively smaller companies can manufacture chemicals which are imported from China, then large, listed companies can do that as well. However, for that these companies need to do incur a significant capex. Please note that listed organic chemical companies, barring UPL, have a revenue of US\$9.5bn and gross block of US\$6.1bn. If organic chemical companies aim to replace US\$6bn worth of imports, then these companies need to incur US\$4-4.5bn capex. As of now, we have seen US\$2bn of capex announcements, out of which US\$0.7bn is by Aarti Industries alone. On the import substitution theme, Jubilant Ingrevia remains our top pick.

Figure 1: In organic chemicals, India had an adverse trade balance with China to the extent of ~US\$5.8bn in CY20

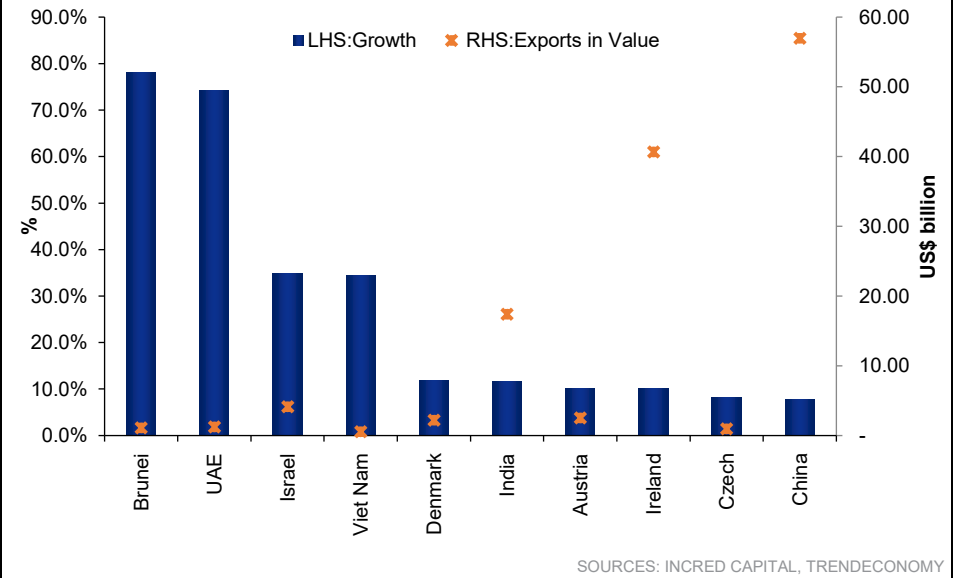


Import substitution is a very big opportunity

China rules global organic chemicals export market

China is the undisputed leader in global organic chemical export market, but there are many rising stars in this market. While we believe that after China, India is the only choice available to companies but last five years' organic chemicals growth data does indicate this. Israel is progressing fast in the chemical space. Its sales have grown at a 74% CAGR over the last four years

Figure 2: While China is the leader, India is a distant third after Ireland who is the leader in pharma grade chemical exports



Israel, Ireland and relatively new entrants like the UAE are doing very well on the export front ➤

Figure 3: China, Ireland, India and Israel are major organic chemical exporters in global market

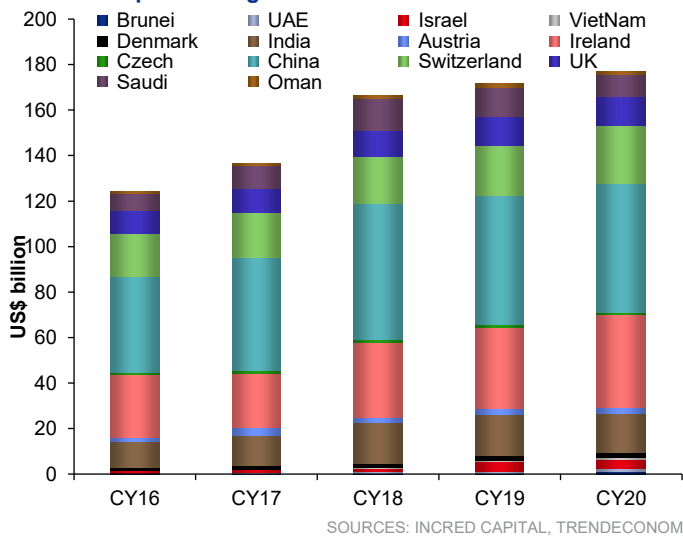
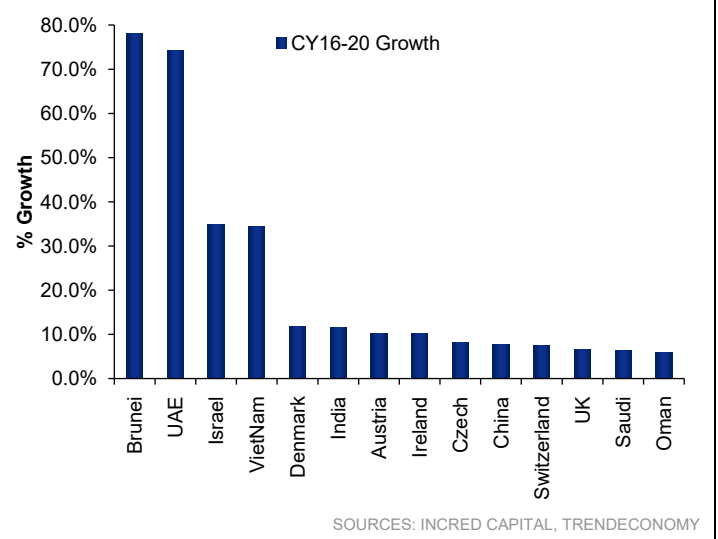
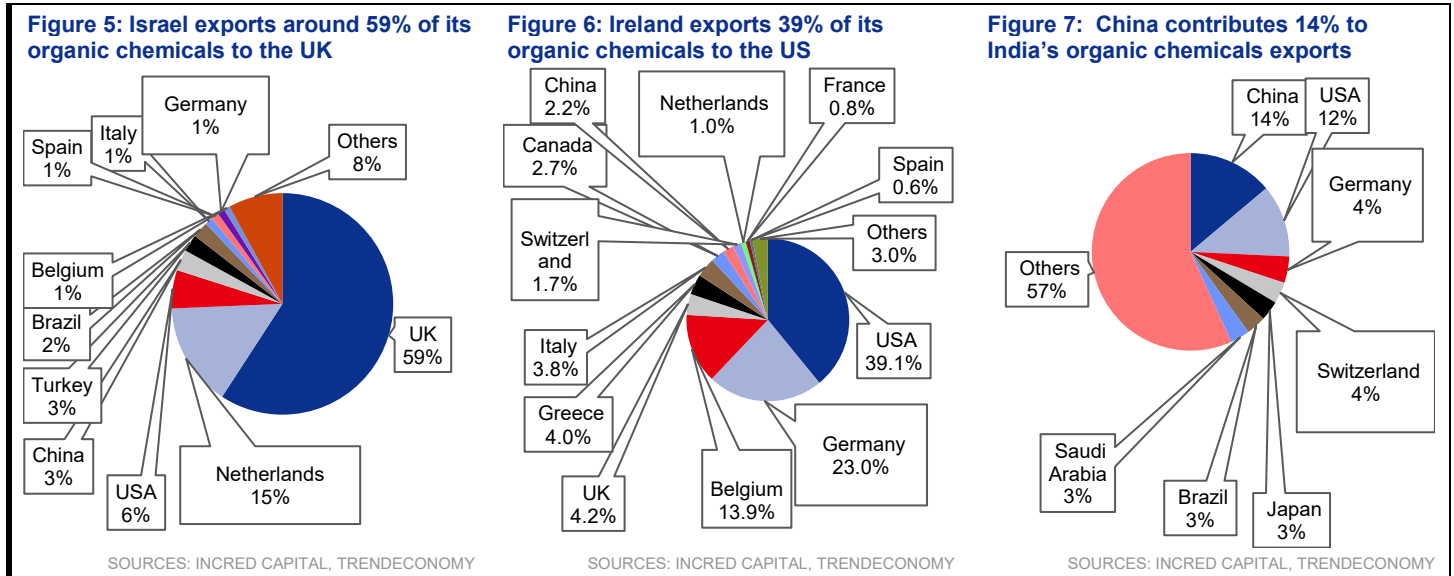


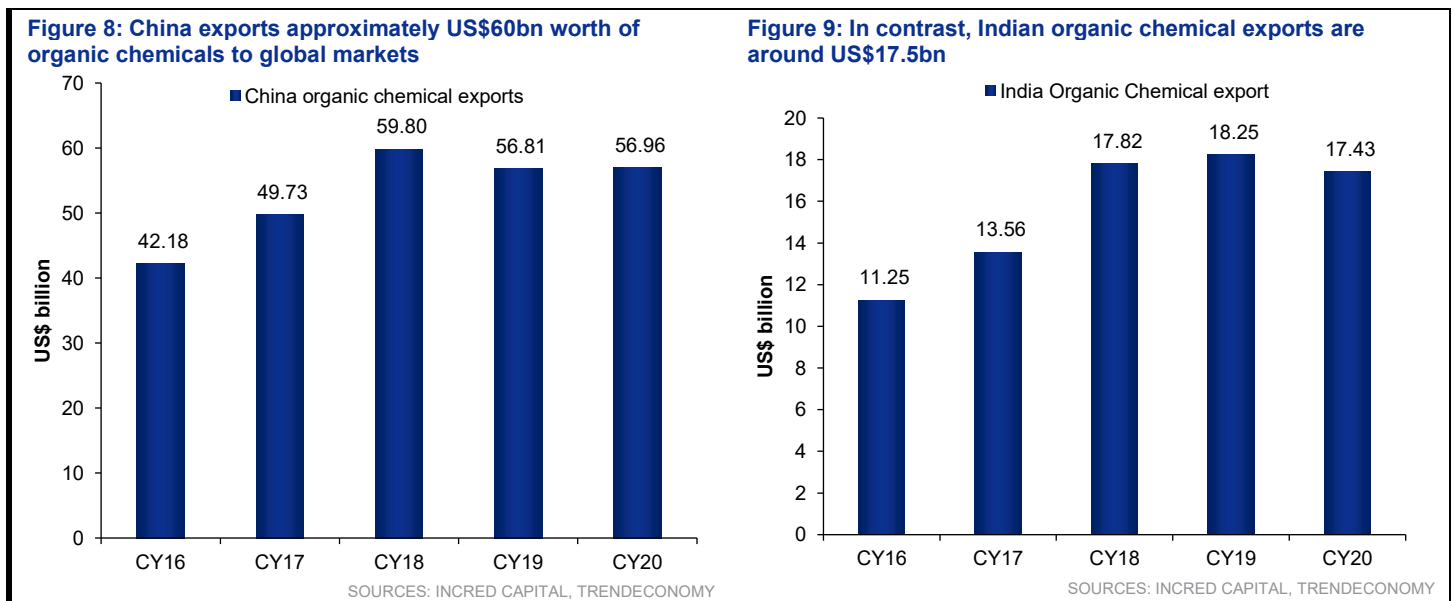
Figure 4: India's export growth is lacklustre compared to new entrants like the UAE and Israel



In India's key export markets, Israel and Ireland's presence is significant limiting India's chance to grab incremental market share



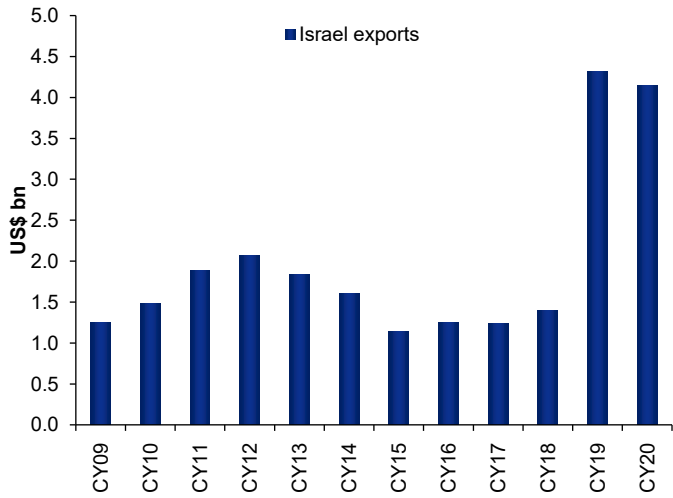
Indian as well as Chinese organic chemical exports have stagnated during the past three years



In global markets, India has tough competitors like Israel and Ireland who are showing stupendous growth

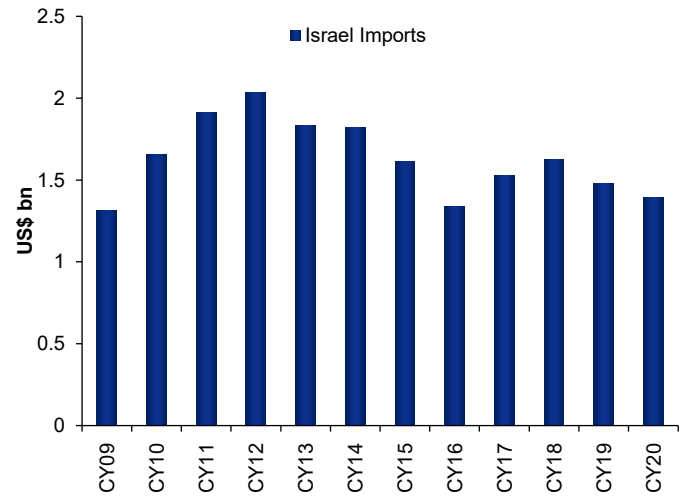
Countries like Israel and Ireland are well entrenched in the global supply chain. They are already showing a stupendous growth. Israel is a prime example of import substitution as well as a rise in its exports.

Figure 10: Israel has done much better than India in capturing incremental market share in global supply chains



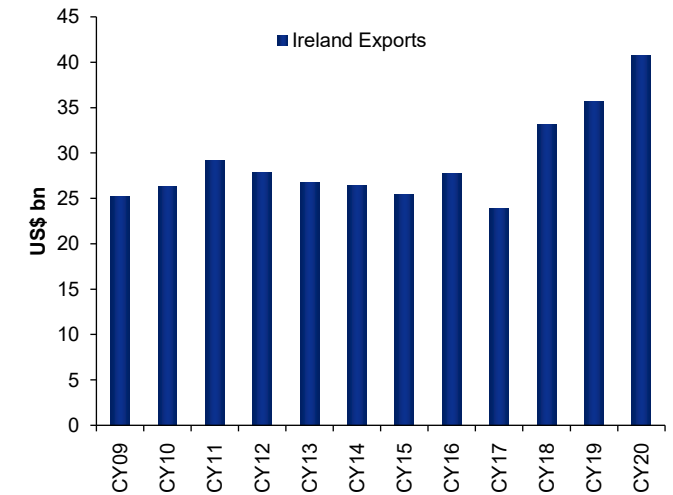
SOURCES: INCRED CAPITAL, TREND ECONOMY

Figure 11: Israel has also reduced its dependence on imports



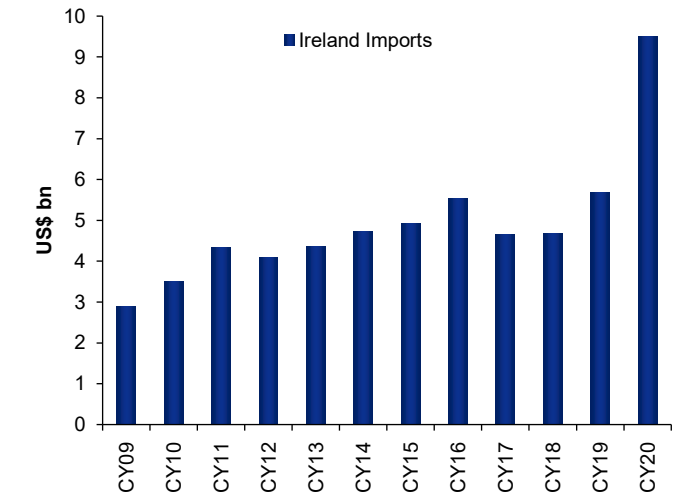
SOURCES: INCRED CAPITAL, TREND ECONOMY

Figure 12: Irish exports have gone up



SOURCES: INCRED CAPITAL, TREND ECONOMY

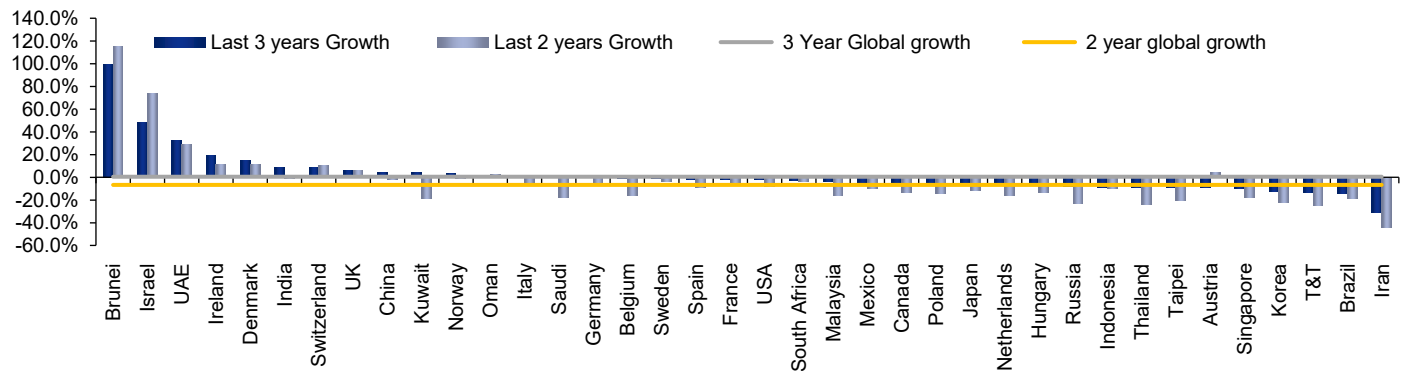
Figure 13: ...but the increase in imports during CY20 is much higher



SOURCES: INCRED CAPITAL, TREND ECONOMY

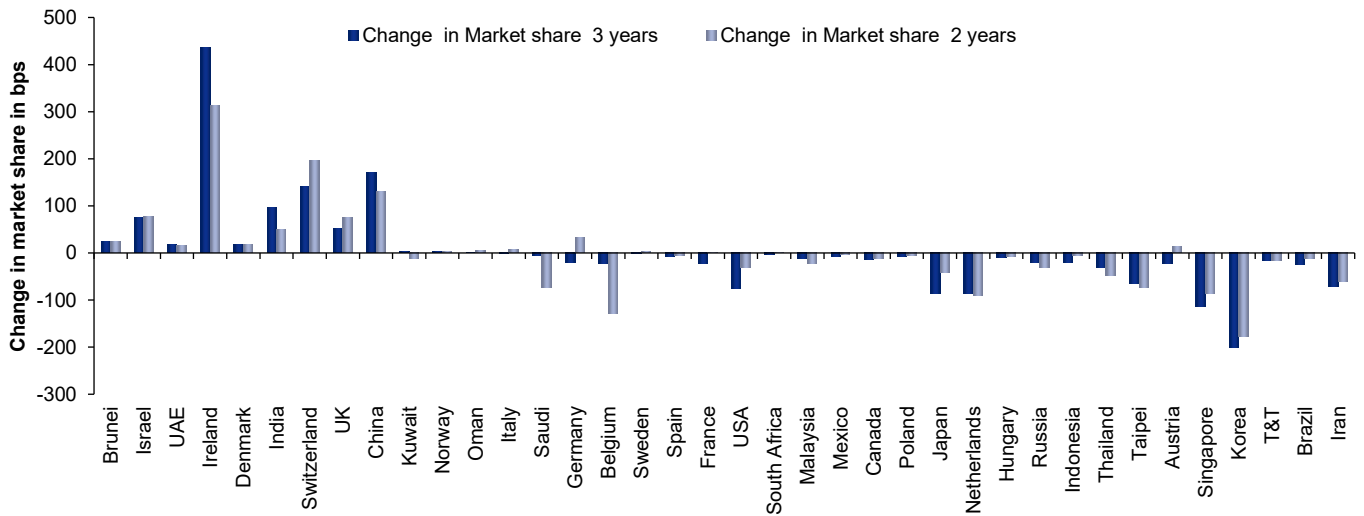
At the same time, change in market share (in exports) and export growth doesn't indicate a big move away from China ➤

Figure 14: The export growth numbers of China (in context with global growth) doesn't indicate a big move away from China



SOURCES: INCRED CAPITAL, TREND ECONOMY

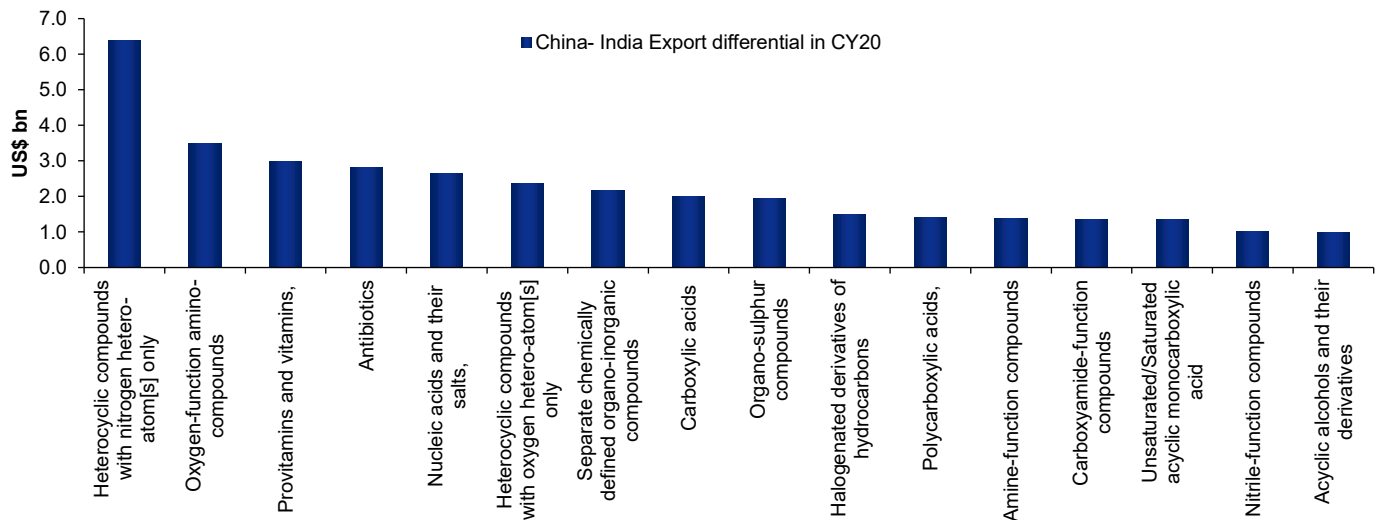
Figure 15: However, the change in market share for exports indicates that Ireland, Israel and Switzerland are performing much better than China as well as India



SOURCES: INCRED CAPITAL, TRENDECONOMY

We have identified the organic chemical classes where China's exports are more than US\$1bn, surpassing that of India ➤

Figure 16: There are 16 organic chemical classes where China exports more than US\$1bn vis-à-vis India - these classes of chemicals present an opportunity for Indian companies in case of a shift in the supply chain to India

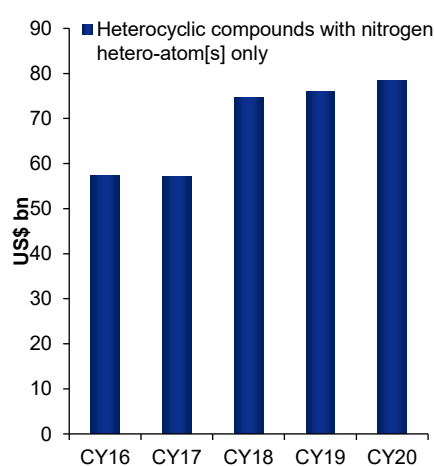


SOURCES: INCRED CAPITAL, TRENDECONOMY

Identifying opportunities in a sub-section of organic chemical exports

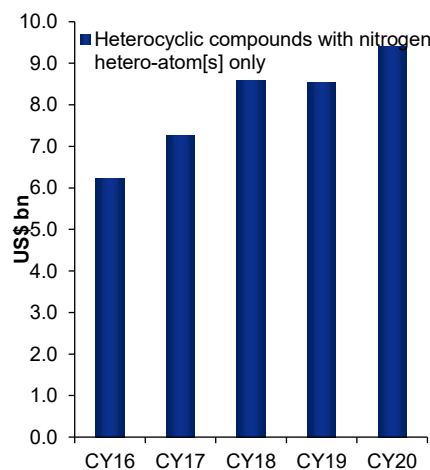
Bulk of Chinese as well as Indian exports comprise heterocyclic compounds with nitrogen hetero-atom

Figure 17: Global exports of this class of chemicals touched US\$78bn in CY20



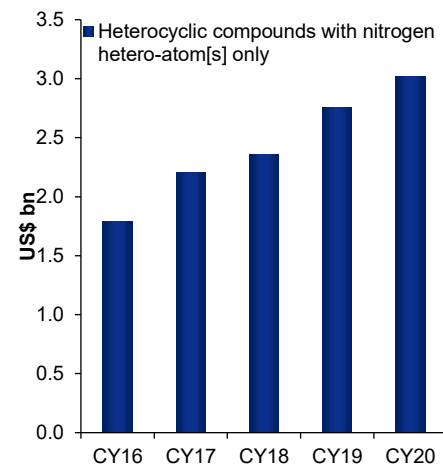
SOURCES: INCRED CAPITAL, TRENDECONOMY

Figure 18: Exports from China stood at US\$9.4bn in CY20



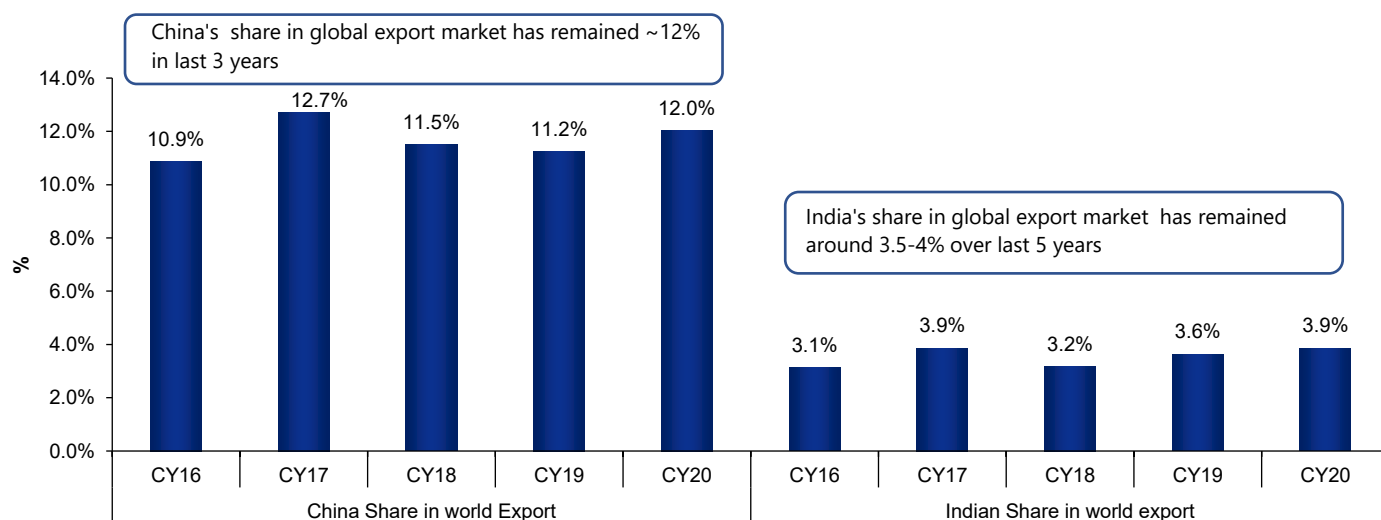
SOURCES: INCRED CAPITAL, TRENDECONOMY

Figure 19: India's exports of this class of chemicals stood at US\$3bn, ~4% of global exports



SOURCES: INCRED CAPITAL, TRENDECONOMY

Figure 20: Chinese market share in global heterocyclic compounds with nitrogen hetero-atom[s] is around 12% as against current Indian market share of 3.9%



SOURCES: INCRED CAPITAL, TRENDECONOMY

Which are the molecules in this chemical class? It's mainly pyridines and pharmaceuticals ►

The chemical class - heterocyclic compounds with nitrogen hetero-atom is a big group and contains following chemicals:

- Benzodiazepine class of pharmaceuticals.
- Class of sedative and anti-anxiety medicines.
- Pyridines and its salts.
- Piperidine and its salts.
- Strong opioid medicines.
- Cyanuric acid and halogenated cyanuric acid.
- Melamine and its derivatives.
- Caprolactam and its derivatives.

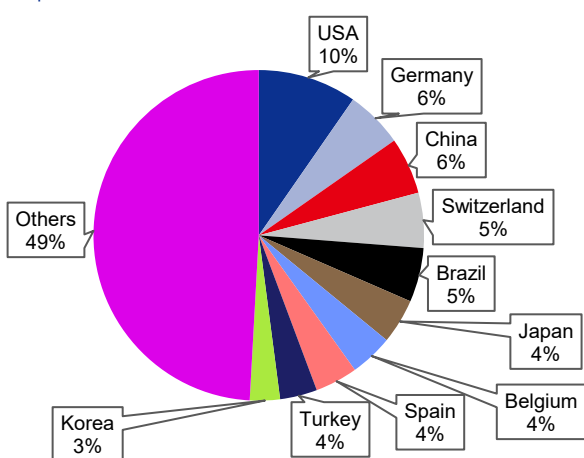
- Lactams – used as antibiotics.
- High blood pressure medicines.
- Various other medicines used for stomach and as anti-depressants.

What if China exports collapse and India gets the opportunity to supply to global markets? API companies stand to benefit ➤

As explained above, most of the heterocyclic compounds with nitrogen hetero-atom are used in pharmaceutical applications. Some chemical and other applications are also there, but mostly API companies stand to benefit. A few such companies (which are under our coverage) stand to benefit from the China+1 policy in heterocyclic compounds with nitrogen hetero-atom.

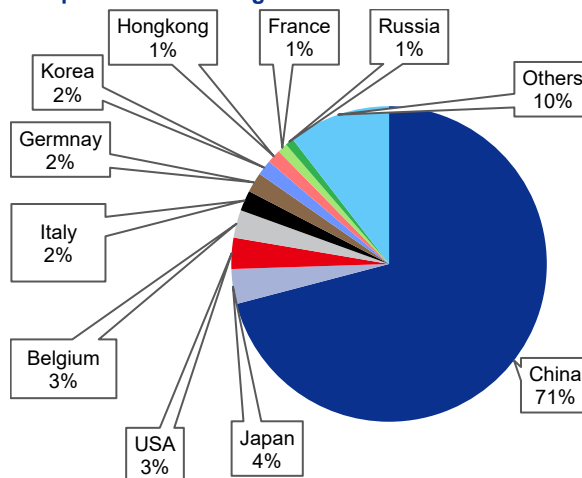
India’s imports from China are almost half of its exports to other countries ➤

Figure 21: Overall Indian exports of this class of chemicals are worth US\$3bn



SOURCES: INCRED CAPITAL, TREND ECONOMY

Figure 22: India Imports ~US\$1.5bn worth of heterocyclic compounds with nitrogen hetero-atom from China

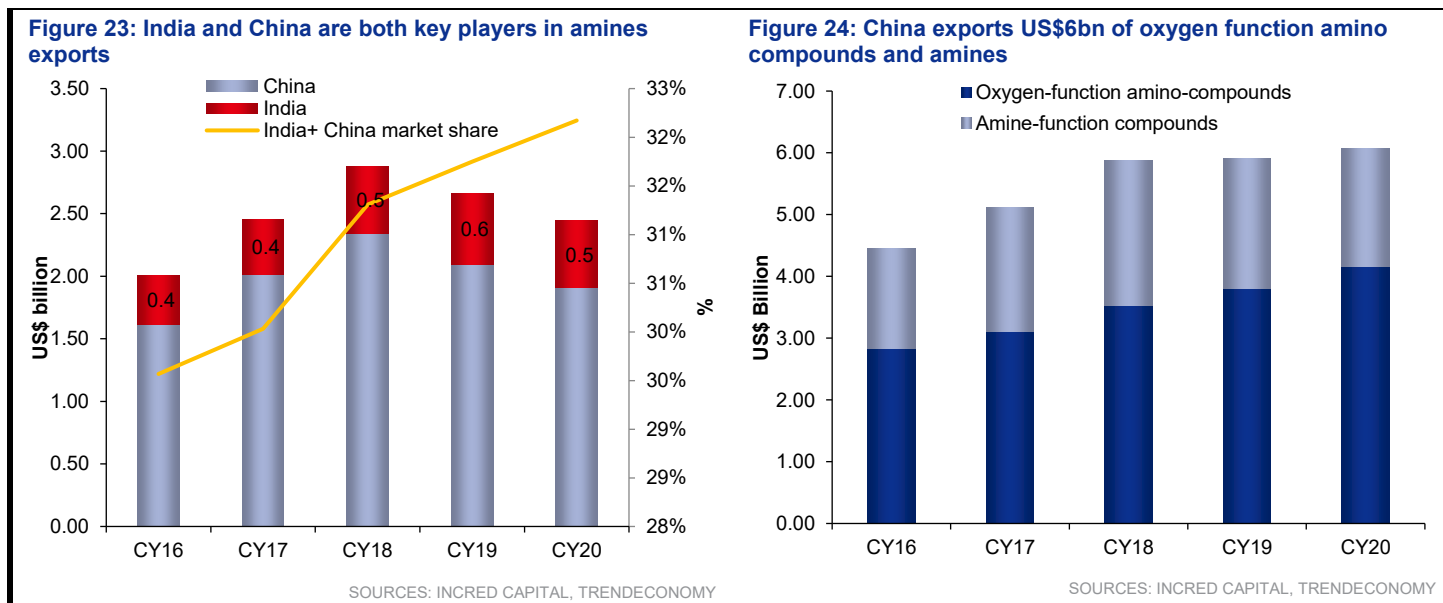


SOURCES: INCRED CAPITAL, TREND ECONOMY

In our view, import substitution offers a much bigger opportunity than the China+1 theory; Jubilant Ingrevia and Ami Organics (unrated) can benefit ➤

Jubilant Ingrevia manufactures pyridines and Ami Organics makes multiple pharma API intermediaries which are used in anti-psychotic drugs (essentially heterocyclic compounds with nitrogen hetero-atom). They can benefit from this opportunity.

Oxygen function amino compounds and amines are other important export items in global market



Following chemicals are a part of oxygen function amino compounds ➤

1. Mono/ Di/ tri ethanolamine and its salts.
2. Amino hydroxy naphthalene sulphonic acids.
3. Anisidine, dianisidine, phenetidines, and their salts.
4. Amino-acids and their esters.
5. Lysine and its esters.
6. Glutamic acid and its salts.
7. Anthranilic acid and its salts.
8. Amino-alcohol-phenols.

Do Indian companies produce oxygen function amino compounds? Only a few and far in between ➤

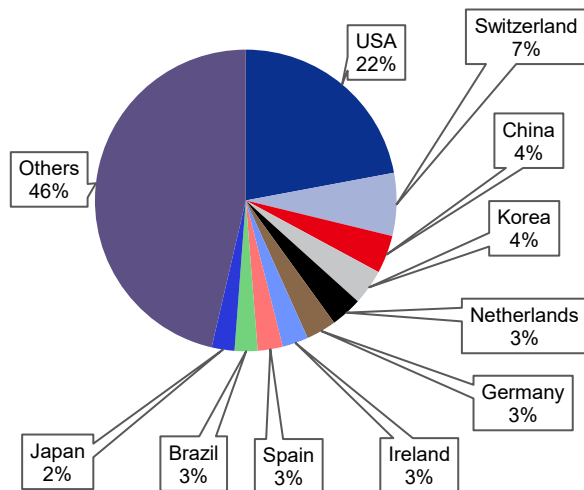
Figure 25: Following companies can potentially gain if Chinese exports shift to India

Chemicals	Indian Manufacturers
Mono/ Di/ tri ethanolamine and its salts	Amines and Plasticizers, Balaji Amines, Pon Pure Chemicals, Alkyl Amines.
Amino hydroxy naphthalene sulphonic acids	Chempro group, RK Synthesis.
Anisidine, dianisidine, phenetidines, and their salts	Seya Industries, Aarti Industries, Sarna Chemicals, Surya Lifesciences, Valiant Organics.
Amino-acids and their esters	NA.
Lysine and its esters	Aditya Chemicals.
Glutamic acid and its salts	Anant Pharmaceuticals
Anthranilic acid and its salts	Aarti industries, Taj Pharmaceuticals, Izah Chemicals, Ishita Industries.
Amino-alcohol-phenols	Amines and Plasticizers, India Glycols.

SOURCES: INCRED CAPITAL, TREND ECONOMY

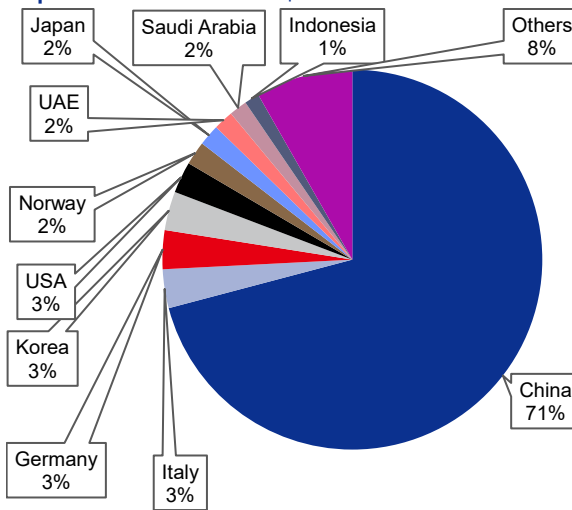
Indian companies have the opportunity to go for import substitution >

Figure 26: India exports nearly US\$700m worth of oxygen function amino compounds in CY20



SOURCES: INCRED CAPITAL, TREND ECONOMY

Figure 27: India's imports are also around US\$780m, with Imports from China at US\$558m in CY20



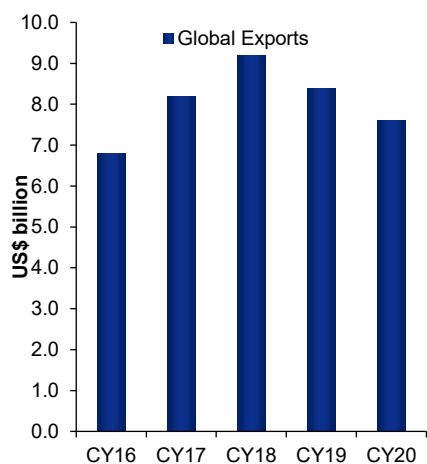
SOURCES: INCRED CAPITAL, TREND ECONOMY

Usage of oxygen function amine compounds is such that shifting of suppliers is not so difficult >

1. Mono/ di/ tri ethanolamine or amine with alcohol and amine characteristics are used in detergents, personal care, textile finishing, and wood-treating products, as well as in oil wells and in metal-working products for preventing corrosion. Also, they can be used as a cement grinding aid, and as a building block in the manufacture of triazine-based corrosion inhibitors.
2. Amino naphthalene sulfonic acids are compounds with the composition $C_{10}H_6(NH_2)(SO_3H)$, being derived from naphthalene ($C_{10}H_8$) substituted by an amino and sulfonic acid groups. These compounds are colourless solids. They are useful precursors to dyes.
3. Anisidines are used as a precursor to dyes. This chemical is commonly manufactured by several Indian companies.
4. Amino acid esters find their use in pharmaceuticals as an anti-cancer agent and in anti-viral drugs.
5. Lysine is an essential amino acid with many benefits that range from **preventing cold sores to reducing anxiety and promoting wound healing**. As a building block of proteins, it may also have numerous other benefits. Because of its usage in the pharmaceutical industry, supply chain penetration for a new player may not be easy.

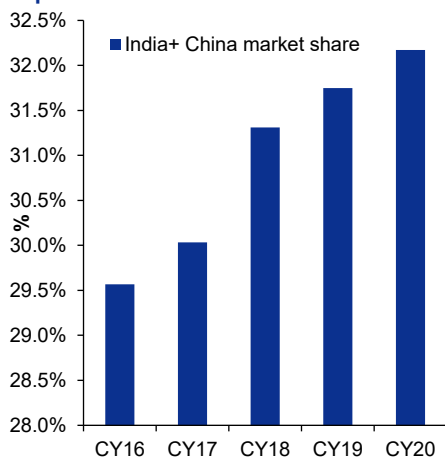
Amine function compound - India's exports are miniscule ➤

Figure 28: Global exports of amines stand at around US\$7.5bn



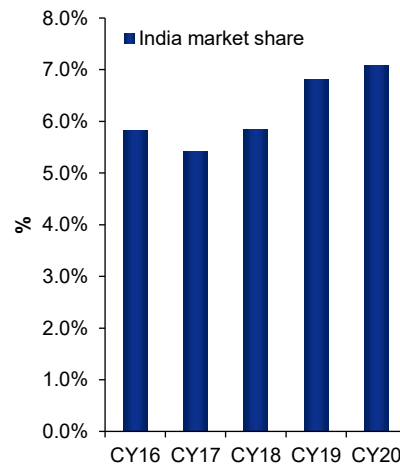
SOURCES: INCRED CAPITAL, TREND ECONOMY

Figure 29: On a combined basis, India and China contribute 32% to these exports



SOURCES: INCRED CAPITAL, TREND ECONOMY

Figure 30: However, India's exports are 1/4th of China's exports



SOURCES: INCRED CAPITAL, TREND ECONOMY

In amines, India can capture incremental market if global supply chains shift to India ➤

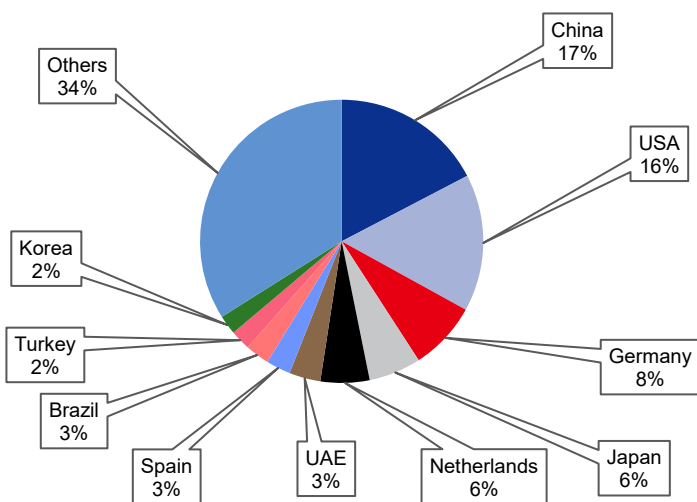
Figure 31: Among listed companies, Balaji Amines, Aarti Industries and Alkyl Amines can get some volume growth if the supply chain shifts to India from China

Chemical names	Manufacturers in India
Methylamine, di- or trimethylamine and their salts	Balaji Amines, Alkyl Amines, Amines and Plasticizers, Rastriya Chemicals and Fertilizers (RCF), Indo Amines, Taj Pharmaceuticals.
Ethylenediamine and its salts	Alkyl Amines, Balaji Amines.
Hexamethylenediamine and its salts	Prakash Chemicals, Alkyl Amines.
Aromatic monoamines and their derivatives	Balaji Amines.
Aniline and its salts	GNFC, HOCL, Anirox Pigments.
Toluidines	Aarti Industries, Seya Industries.
Diphenylamine and its derivatives	LANXESS India, Otto Chemie Private Limited, Par Industries, Aarti Industries.
Alpha-naphthylamine, beta-naphthylamine	Aceto Chem Private Limited, Mahatma Dye Chem Private Limited, Glenham Chemical Private Limited.
o-, m-, p-Phenylenediamine, diaminotoluenes	Jay Organics, Aarti Industries, Laxness India, Deepak Nitrite.

SOURCES: INCRED CAPITAL, TREND ECONOMY

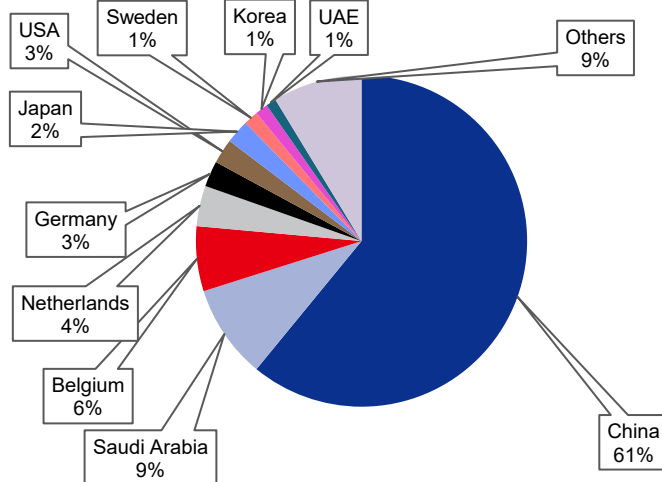
India imports a big quantity of amine function compounds from China - substitution is the best option ➤

Figure 32: India exports are fragmented, but China is still the biggest importer (US\$540m exports in CY20)



SOURCES: INCRED CAPITAL, TREND ECONOMY

Figure 33: India imports 61% of amine function compounds from China (out of US\$ 631m imports in CY20)

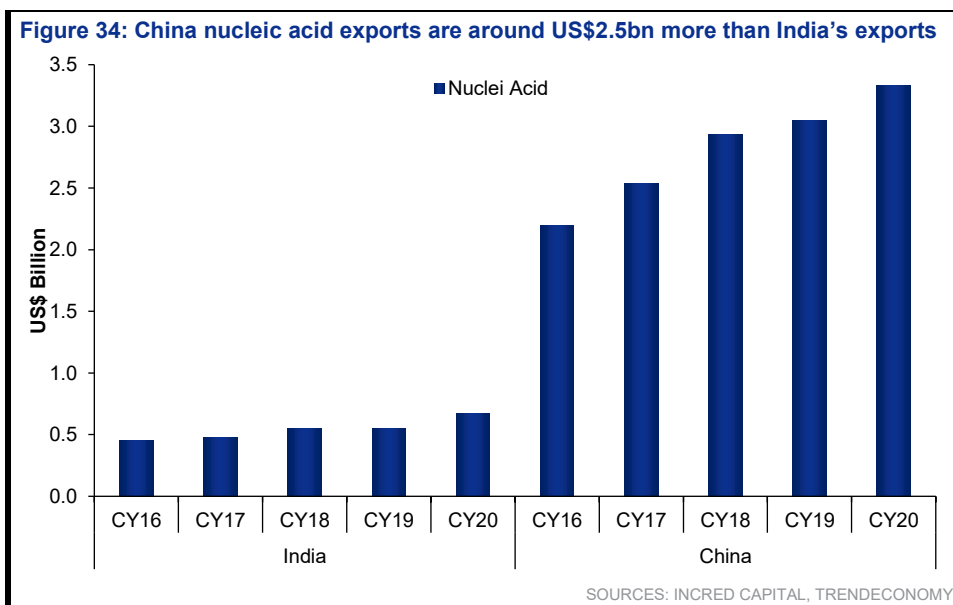


SOURCES: INCRED CAPITAL, TREND ECONOMY

The usage of amine function compounds also indicates that import substitution is very easy ➤

1. **Methylamine, di- or trimethylamine and their salts** - They are used for making pharmaceuticals, insecticides, paint removers, surfactants, rubber chemicals. Methylamine is the simplest of methylamines, consisting of ammonia bearing a single methyl substituent. It has a role as a mouse metabolite.
2. **Ethyldiamine and its salts** - Ethylenediamine is an organic compound that is used as a building block to produce many other chemical products. It is also used as an excipient in many pharmacological preparations such as creams. Notably, ethylenediamine is a contact sensitizer capable of producing local and generalized reactions.
3. **Aromatic monoamines** - They are used to make drugs that increase or reduce the effect of monoamine neurotransmitters, which are used to treat patients with psychiatric and neurological disorders, including depression, anxiety, schizophrenia and Parkinson's disease
4. **Aniline** - An organic base used to make dyes, drugs, explosives, plastics, and photographic and rubber chemicals.
5. **Toluidines**- Used primarily in the manufacture of dyestuffs, although it is also used in the production of rubber, chemicals, and pesticides and as a curing agent for epoxy resin systems.
6. **Diphenylamine** - It is used mainly for its antioxidant properties. Diphenylamine is widely used as an industrial antioxidant, dye mordant and reagent, and is also employed in agriculture as a fungicide and antihelmintic.
7. **Naphthylamine** - It is used commercially as an intermediate in the manufacture of dyes, as an antioxidant in the rubber industry, and to produce 2-chloronaphthalene.
8. **Phenylenediamine** - It is used to produce aramid fibre, antioxidants, as a laboratory reagent, in photographic developing, and as a dye for hair and furs. Phenylenediamine is primarily used as a dye intermediate and also as a dye.

Nucleic acid and its salt chemical class - China exports ~US\$2.5bn more than what India does



Most chemicals are used to manufacture psychotic drugs where the expertise lies with pharmaceutical companies ➤

Figure 35: In this space, there are multiple small pharmaceutical API manufacturers who can benefit from shifting of the supply chain

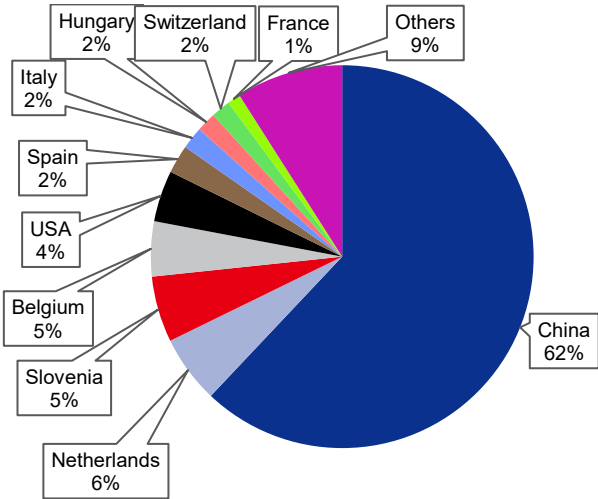
Chemicals	Manufacturers in India
Benzothiazole	Otto Chemie India Private Limited, Dadia Chemicals.
Phenothiazine	Otto Chemie India Private Limited, Sunshine Laboratories India Limited, Alex Industries, Axiom Chemicals India Private Limited .
Aminorex	Could not find any significant player.
Brotizolam	
Clotiazepam	
Oxazolam	
Cloazolam	
Haloxazolam	
Ketazolam	All these are narcotic substances and are manufactured by various pharma companies like Aarti Drugs etc.
Dextromoramide	
Mesocarb	
Pemoline	
Phendimetrazine	
Sufentanil	

SOURCES: INCRED CAPITAL, TREND ECONOMY

India imports ~US\$650m and exports US\$680m in nucleic acid chemical class ➤

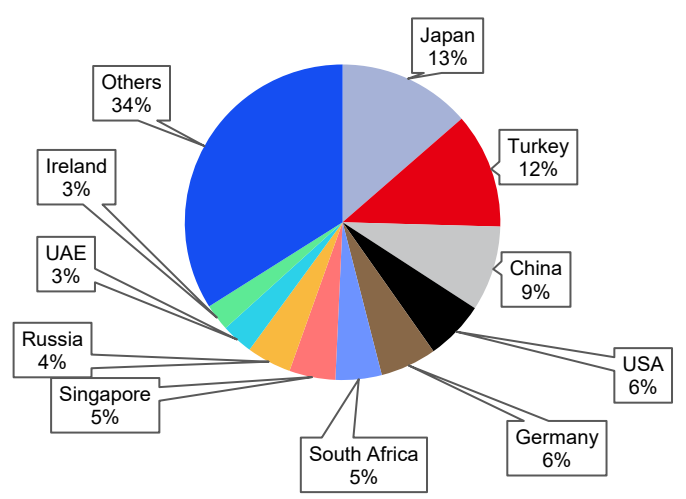
India will do better to first replace China as a preferred supplier in the domestic market. Getting integrated to the global supply chain of big companies can come later. Sales of Indian nucleic acid manufacturing companies can increase by US\$400m or 70% if they are able to replace China as a preferred supplier to Indian customers.

Figure 36: China exported US\$400m nucleic acid and its salt to India as at CY20-end, which is nearly 65% of India's exports



SOURCES: INCRED CAPITAL, TRENDECONOMY

Figure 37: India's exports are fragmented (as at CY20-end) with Japan as the single-largest trading nation

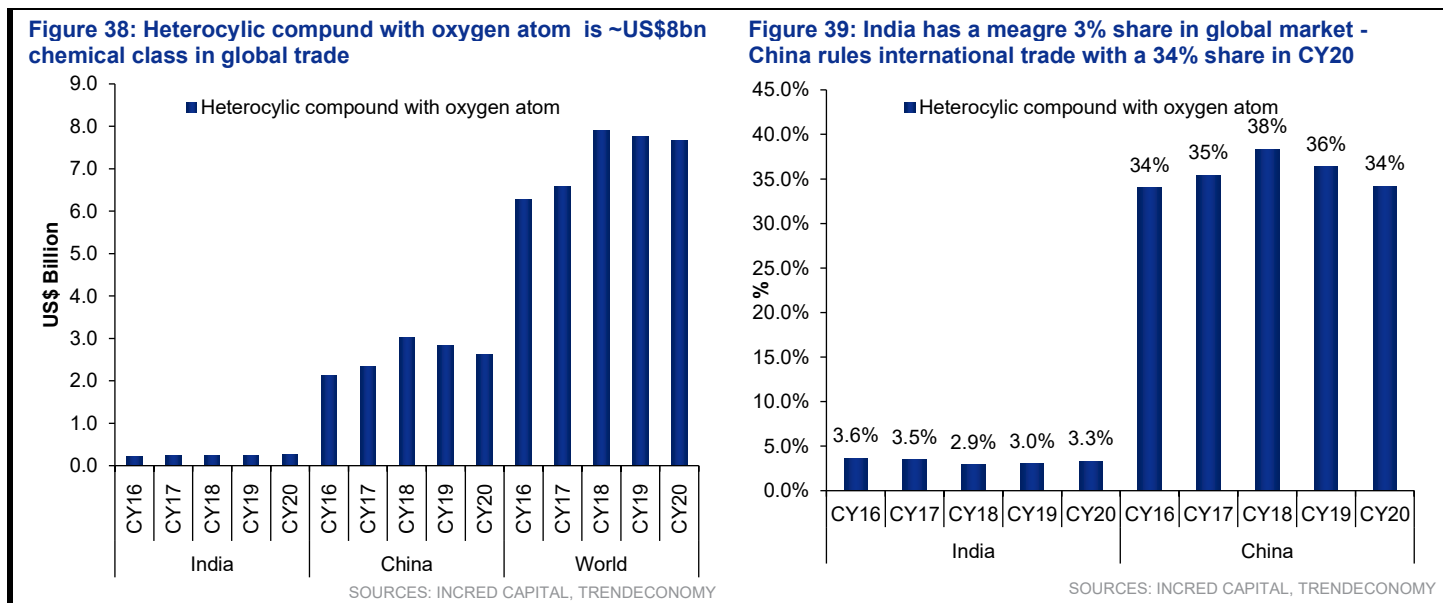


SOURCES: INCRED CAPITAL, TRENDECONOMY

Heterocyclic compounds with oxygen hetero-atom presents a case for import substitution

Substitution of the purchase of US\$250m worth of chemicals from China is the real opportunity for Indian manufacturers. Integrating with the local company supply chain is much easier than exporting to other countries' pharmaceutical supply chains.

Heterocyclic compounds with oxygen hetero-atom is another class of chemicals that are big in global trade ➤



The class of chemicals that has multiple products ➤

We have listed these products and their manufacturers in India. Most of these manufacturers are small pharmaceutical companies and laboratories.

Figure 40: Most chemicals are manufactured by small pharmaceutical companies and laboratories

Chemical names	Manufacturers
Tetrahydrofuran	Standard Reagents Pvt. Ltd, Otto Chemie Pvt Ltd, LANXESS India.
Furaldehyde	Otto Chemie private limited, Galaxy Laboratories Private Limited, Godavari Bio Refineries Limited, Arva Synthetics.
Furfuryl alcohol and tetrahydrofurfuryl alcohol	Arva Synthetics, Vinayak Organics, Otto Chemie Private Limited
Sucralose	Advance Inorganics.
Hydroxy dibenzofuran carboxylic acid	NA.
Coumarin, methyl coumarins and ethyl coumarins	Omkar Chemicals, Oswal Chemicals.
Phenolphthalein	Small manufacturers in India.
Isosafrole	Taj Pharmaceuticals.
1-(1,3-Benzodioxol-5-yl) propan-2-one	Multiple pharmaceutical companies
Piperonal	Crown Chemicals Pvt Limited, Taj Pharmaceuticals, MDB Chemicals, CNS Chemicals.
Safrole	Taj Pharmaceuticals.
Tetrahydrocannabinols	Multiple pharmaceutical companies.
Cineole	Multiple pharmaceutical companies.

SOURCES: INCRED CAPITAL, TREND ECONOMY

What are heterocyclic compounds with oxygen hetero-atom ➤

Oxygen-containing heterocycles are an important class of compounds in organic chemistry. These compounds are used as drugs (coumarin and oxazole), solvent (tetrahydrofuran), and flavours, and fragrances (lactones). Some of the fused compounds are coumarin (benzopyrans) and piclozotan (benzoxazepines).

Can the supply chain easily shift to India if the China +1 policy is followed? It's difficult ➤

Essentially, these are pharmaceutical compounds where changing a supplier doesn't happen swiftly because it takes a long time. While we don't claim to forecast with certainty, it's clear that it cannot happen in a year or two.

India imports a significant amount of these chemicals ➤

Figure 41: India imported US\$250m worth of heterocyclic compounds with oxygen atom from China in 2020

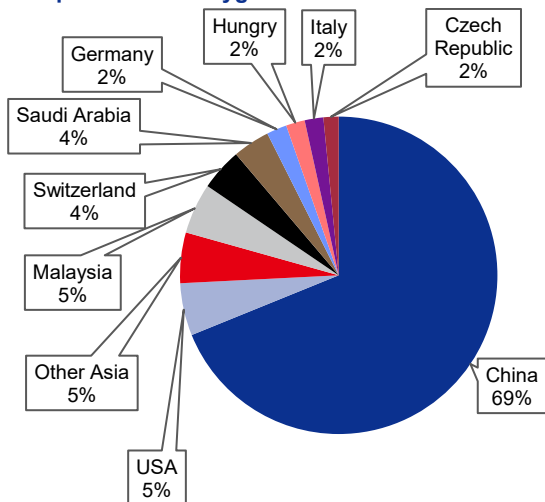
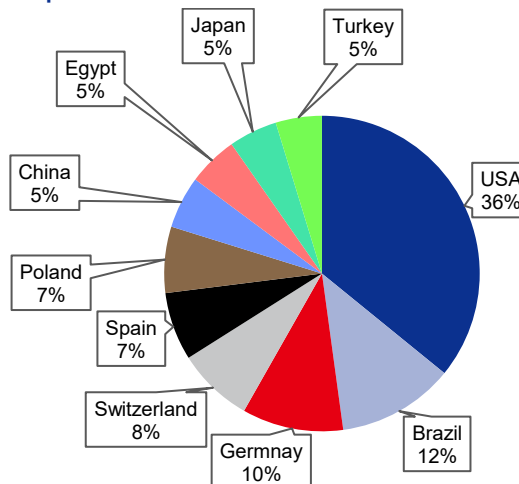


Figure 42: Exports from India stood at US\$150m, primarily to Europe and USA



SOURCES: INCRED CAPITAL, TRENDECONOMY

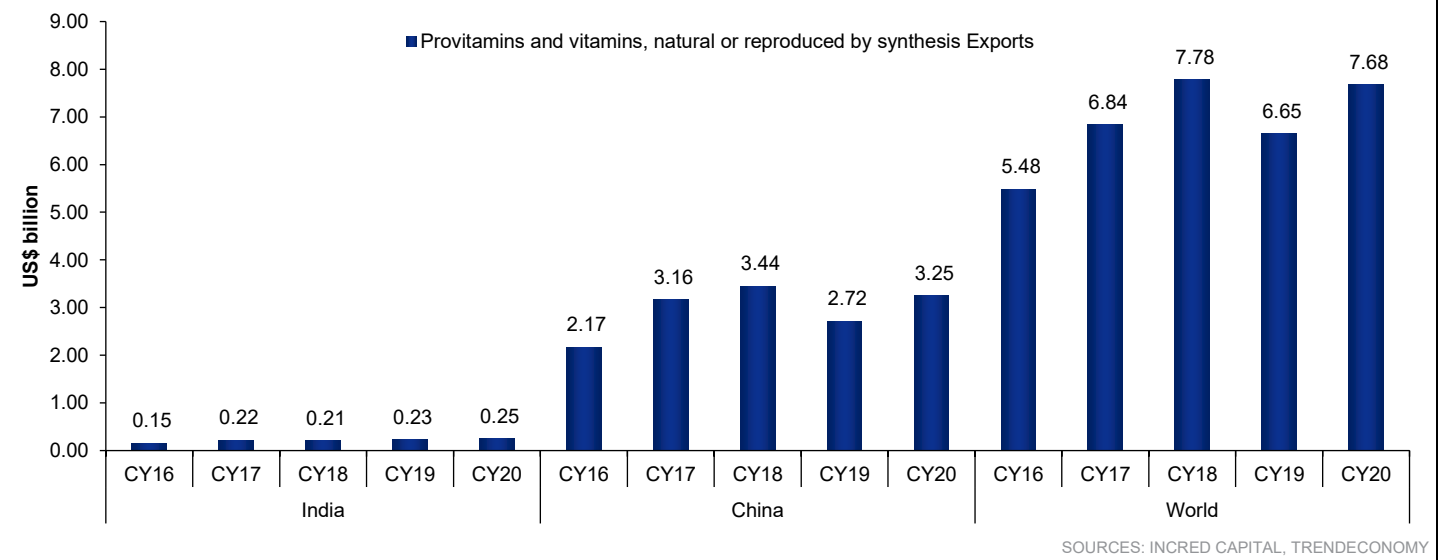
SOURCES: INCRED CAPITAL, TRENDECONOMY

The opportunity lies in integrating local supply chains ➤

The biggest opportunity lies in integrating local supply chain with local production. India imports ~US\$175 million worth chemicals from china which can be supplied by multiple local players

Provitamins and vitamins - natural or produced by synthesis

Figure 43: India's exports are miniscule, and China controls approximately 40% of global export market



While India's exports are miniscule compared to China, interestingly imports from China are 2x total exports ➤

Figure 44: India exported ~US\$ 250m worth of vitamins in CY20

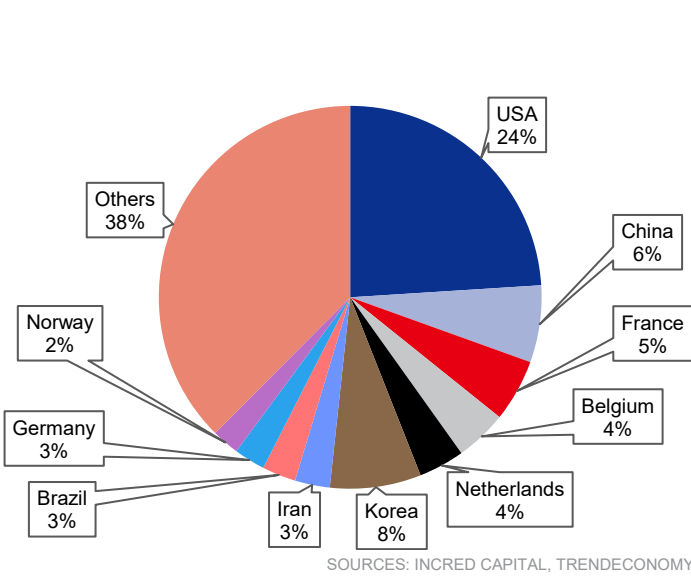
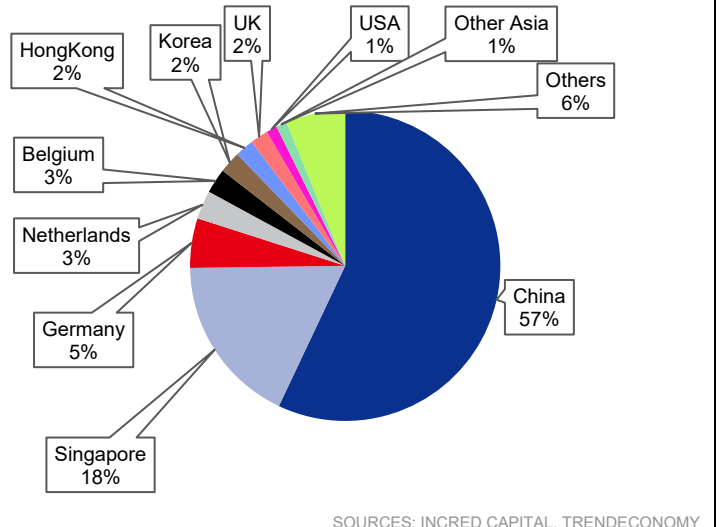


Figure 45: However, imports from China alone stood at US\$106m, which is 40% of total exports from that country in CY20



India has several manufacturers who can ramp up capacity to replace imports from China ➤

Figure 46: There are several India manufacturers of provitamins and vitamins who can replace imports from China

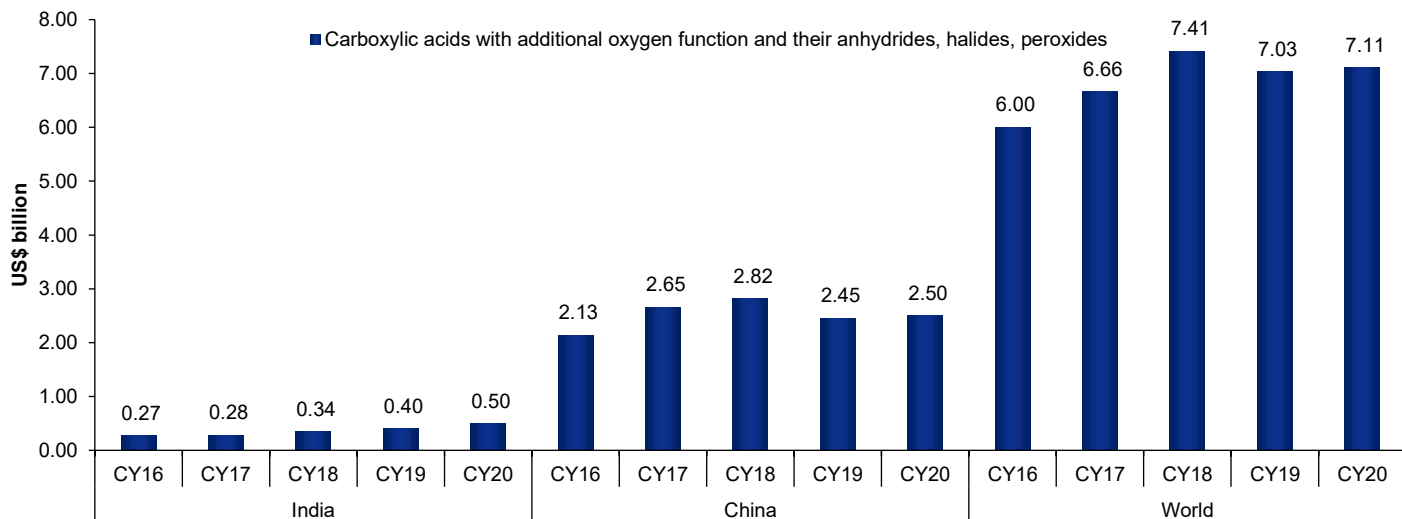
Chemical names	Manufacturer
Vitamin A	Dishman Carbogen Amics, Vital Pharmaceuticals and others.
Vitamin B1	Kavya Pharma, Alpspure LiveScience, Otto Chemie Private Limited, Regulus Pharmaceuticals, Angle Bio Pharma and others.
Vitamin B2	Axis Pharma Chem, U. K. Vet Chem, Mitushi BioPharma, Supriya Lifesciences Limited, Qualiteck Pharma, Hoventa Pharma.
Vitamin B3	Veer Chemie, Jubilant Ingrevia, Krishana Enterprises, Western Drug Limited
Vitamin B5	Alpspure Life Sciences Private Limited, Avanscure, Zydus Cadila Healthcare Ltd, Chemzone Pharma.
Vitamin B6	Alpspure Life Sciences Private Limited, Kavya Pharma, Wellona Pharma, Manus Aktteva Biopharma LLP, DSM Pharmaceutical
Vitamin B12	Multiple Indian manufacturers.
Vitamin C	Shilpa Medicare, Soham Organics, Allecra Healthcare, Hoventa Pharma, India Phosphate, Qulaitek Pharma and many others.
Vitamin E	Fairchem, Matrix Fine Sciences, Care Pharmaceuticals, Dakshin Laboratories.
Vitamin B9	Hema Pharmaceuticals, RL Fine Chem, Octavious Pharma, MLM Products.
Niacinamide	Jubilant Ingrevia, Lasons India, Krishna Enterprises.
Vitamin K	Vijayawada Chemicals, Merion Care, Biological E Limited, Genmedic Healthcare Limited.
Vitamin D	Fermenta Biotech.
Vitamin H	NA

SOURCES: INCRED CAPITAL, TRENDECONOMY

Carboxylic acids with additional oxygen function and their anhydrides, halides, peroxides

Global trade in this category is US\$7.1bn. India exports US\$500m worth of chemicals, but also imports ~US\$520m of chemicals. India's largest imports are from China, at US\$227m. Here again, rather than looking to other countries, if Indian companies can convince local customers to buy from them, then it will be a win-win situation for all.

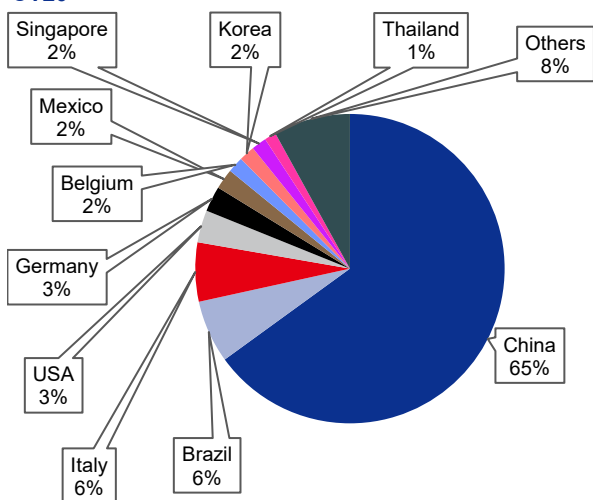
Figure 47: As always Indian exports is miniscule compared to the global exports numbers.



SOURCES: INCRED CAPITAL, TRENDECONOMY

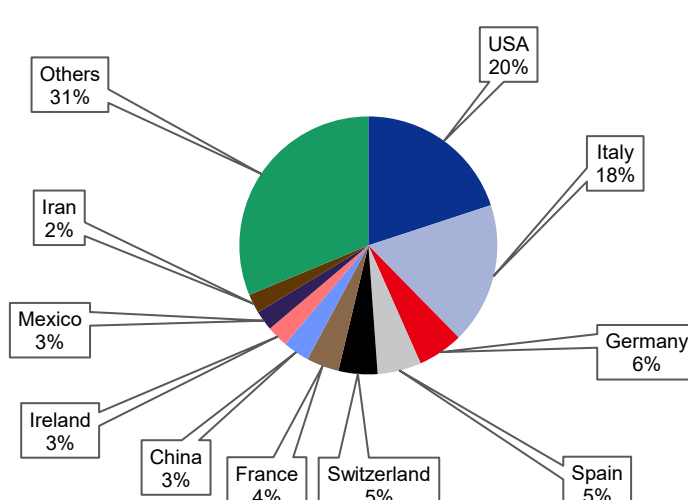
India imports around US\$0.5bn of this chemical class and exports almost an equal value ➤

Figure 48: India's imports from China amounted to US\$337m in CY20 or approximately 67% of total exports from India during CY20



SOURCES: INCRED CAPITAL, TRENDECONOMY

Figure 49: India's exports are widely spread with the US and Europe being the biggest customers



SOURCES: INCRED CAPITAL, TRENDECONOMY

Usage of carboxylic acids with additional oxygen function and their anhydrides, halides, and peroxides indicates that import substitution is an easy possibility ➤

Figure 50: The usage of chemicals indicates that Indian companies can easily substitute imports from China - rather than focusing on penetrating global supply chains, Indian companies will be better off trying to replace imports from China

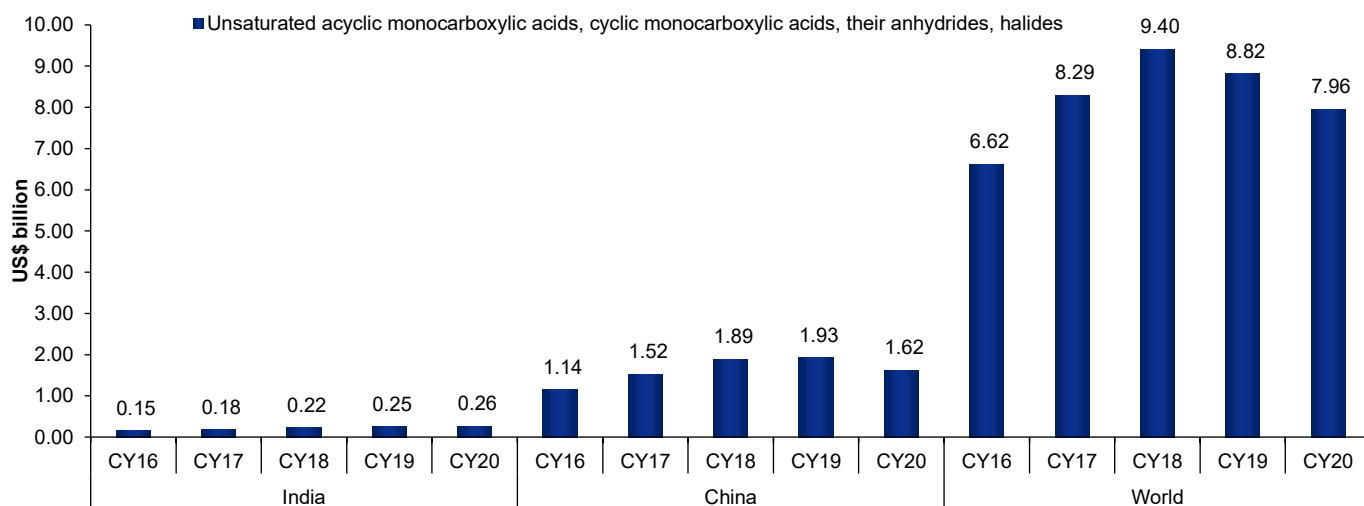
Name of Molecules	Manufactures	Uses
Lactic acid, its salts and esters	Godavari Bio Refineries, Ennore India Chemicals, Anmol Chemical Group	Lactic acid is widely used as an acidulant, flavour enhancer, and shelf-life extender in foods and beverages; its sodium and potassium salts have preservative and antimicrobial properties.
Salts and esters of tartaric acid	Otto Chemie Private Limited, Savannah Surfactants Ltd, and others	It is used in photography, in the making of wine and also in making salts and esters. It occurs naturally in a lot of fruits, most notably in grapes, also in bananas, in tamarinds, and citrus. The salt, potassium, and bi-tartrate of this acid are usually known as cream of tartar.
Salts and esters of citric acid	Ennore India Chemicals	Citric acid and its diammonium, potassium and sodium salts are all used to help preserve cosmetics and personal care products by chelating (complexing) metals. Citric acid and its salts are also added to cosmetics to help adjust the acid/base balance.
Gluconic acid, its salts and esters	Ennore India Chemicals, Prasthista Industries, Hindustan Bec Tech India Pvt Ltd	This agent and its derivatives can be used in formulation of pharmaceuticals, cosmetics and food products as additive or buffer salts . Aqueous gluconic acid solution contains cyclic ester glucono delta lactone structure, which chelates metal ions and forms very stable complexes.
Benzilic acid	Triveni Chemicals, Aditya Chemical Works, Otto Chemie Private Limited, Ralington Pharma, Sisco Research Laboratories Pvt. Ltd.	Benzilic acid is used in the manufacture of glycolate pharmaceuticals including clidinium, dilantin, flutropium, and mepenzolate which are antagonists of the muscarinic acetylcholine receptors.
Chlorobenzilate (ISO)	None. This chemical is banned in many countries.	Chlorobenzilate was introduced as a technical product in 1952. It has been used mainly as a miticide on citrus crops or to control mites in beehives.
Benzeneacetic acid	Otto Chemie Private Limited, Atul Limited, Sheetal chemicals, Premier Group of Industries	Phenylacetic acid is an agent used as an adjunct to treat acute hyperammonaemia and associated encephalopathy in adult and paediatric patients with deficiencies in enzymes of the urea cycle. Phenylacetic acid is an organic compound containing a phenyl functional group and a carboxylic acid functional group.
Salicylic acid and its salts	Credo Life Sciences, Indo French Laboratories Limited	Salicylic acid as a medication is used commonly to remove the outer layer of the skin. As such, it is used to treat warts, psoriasis, acne vulgaris, ringworm, dandruff, and ichthyosis.
Gallic acid	Anmol Chemicals, Peer Industries, Otto Chemie Private Limited, CDH Fine Chemical	Gallic acid is a well-known natural antioxidant that is basically a secondary polyphenolic metabolite. Gallic acid is a very important common antioxidant tea formulation, known as an Ayurvedic herb. Apart from its phytochemical role, gallic acid is also used in tanning, ink dyes, and the manufacture of paper.
Beta hydroxy naphthoic acid	Vijen Biotech, Multi Organics Private Limited, Advance Group of Companies	Hydroxy naphthoic acid is a precursor to many anilides, such as naphthol AS, which are reactive toward diazonium salts to give deeply coloured azo compounds. Azo coupling of 3-hydroxy-2-naphthoic acid gives many dyes as well.
Levulinic acid	Vizag Chemical industry, Otto Chemie Private Limited, BioCare Laboratories, Sisco Research Laboratories Pvt. Ltd.	Levulinic acid is used as a precursor for pharmaceuticals, plasticizers, and various other additives. The largest application of levulinic acid is its use in the production of aminolevulinic acid, a biodegradable herbicide used in South Asia. Another key application is the use of levulinic acid in cosmetics.
Ethyl aceto acetate (acetoacetic ester)	Laxmi Organics, Ami Enterprises, Muby Chemicals, Sontara Organo Industries, Lonza Chemicals	The organic compound ethyl acetoacetate (EAA) is the ethyl ester of acetoacetic acid. It is a colourless liquid. It is widely used as a chemical intermediate in the production of a wide variety of compounds. It is used as a flavouring for food.
Nalidixic acid	Exilir Pharma, Unimark Remedies, Ishita Drugs and Industries	Nalidixic acid is used in the treatment of bacterial infections. It is also used in infections of urinary tract, tonsils, sinus, nose, throat, female genital organ, skin & soft tissues and lungs (pneumonia). Nalidixic acid is an antibiotic. It works by stopping the action of a bacterial enzyme called DNA-gyrase.
Fluoro benzoyl butyric acid	Kavya Pahrma, Minal Enterprises	
Sodium phenoxy acetate	Premier Industries Private Limited,	Sodium phenoxy acetate (SPA) is most commonly used in the fermentation of Penicillin V. Patent literature also refers to herbicidal carboxylic acid salts of alkylamines, synthesis of insect repellents, esters of cortical hormones and cation exchange resins. Sodium phenoxy acetate is available in packs of 20kg.

SOURCES: INCRED CAPITAL, TRENDECONOMY

Unsaturated acyclic monocarboxylic acids, cyclic monocarboxylic acids, their anhydrides, and halides

Global trade in this category is US\$8bn. India exports US\$260m worth of chemicals, but it also imports ~US\$685m of chemicals. India's largest imports are from China, at US\$288m. Here again, rather than looking to other countries, if Indian companies can convince local customers to buy from them, then it will be a win-win situation for all.

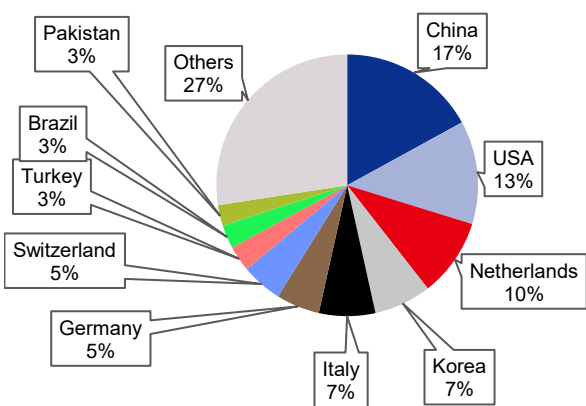
Figure 51: India's exports US\$260m worth of chemicals in this class, but imports are around US\$685m; interestingly, Indian imports from China at US\$288m are 10% more than overall exports from the country



SOURCES: INCRED CAPITAL, TREND ECONOMY

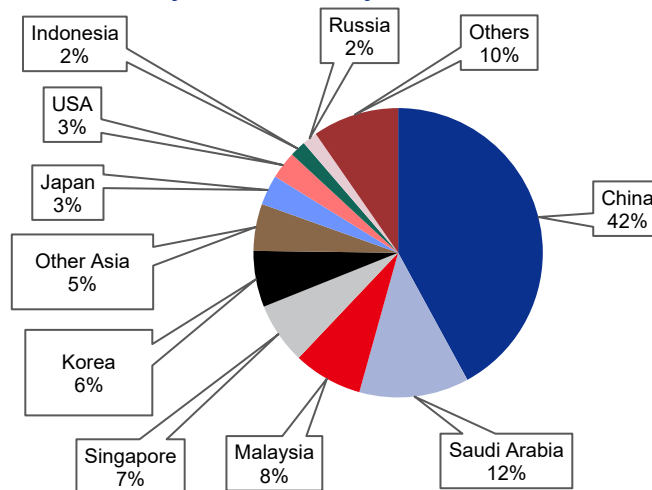
India imports around US\$0.69bn worth of this chemical class and exports almost 40% of the import value ➤

Figure 52: Total exports of unsaturated acyclic monocarboxylic acid chemicals was US\$258m in CY20



SOURCES: INCRED CAPITAL, TREND ECONOMY

Figure 53: In CY20, India imported nearly US\$288m worth of unsaturated acyclic monocarboxylic acid chemicals from China



SOURCES: INCRED CAPITAL, TREND ECONOMY

India has several manufacturers of unsaturated acyclic monocarboxylic acid class of chemicals ➤

Multiple manufacturers and the usage of the chemicals indicate the same thing as earlier “replacing China from domestic consumption is much easier than plugging oneself in the global supply chain”.

Figure 54: Multiple Indian companies manufacture the above class of chemicals and their usage also suggests that replacing China from the supply chain is not difficult

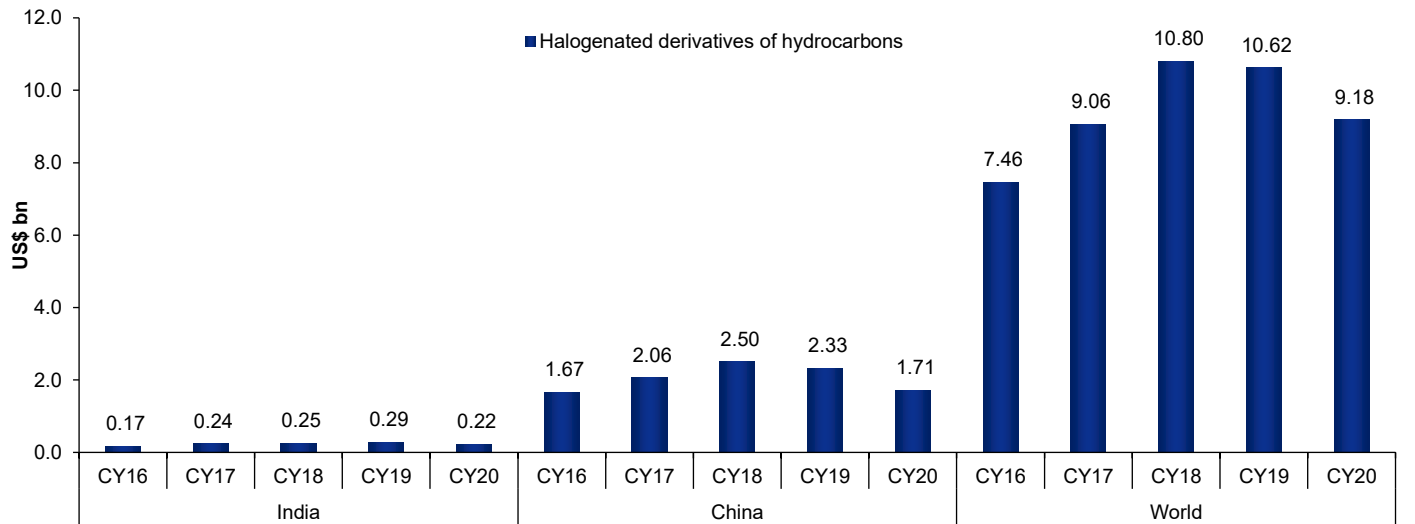
Name	Company	Uses
Pivaloyl chloride	Shreeji Chemical Industries, Triveni Chemicals	Pivaloyl chloride is used as an input in the manufacture of some drugs, insecticides and herbicides.
N-valeryl chloride	Shiva Pharma Chem, Omega Finechem private Limited,	Valeryl chloride is an intermediate for pharmaceuticals, agrochemicals, surfactants, fragrances, electronic chemicals.
N-octanoyl chloride	Bharat Rasayan, Shiva Pharma chem, Organo Chemicals	Octanoyl chloride is an eight-carbon acyl chloride with a straight-chain structure that is used as a reagent in organic synthesis.
Neodecanoyl chloride	Triveni Chemicals, Shiba Pharma chem, AVA Chemicals	Neo decanoyl chloride is a colourless to slight yellowish liquid which mainly used in the manufacture of organic peroxide initiators. It is an active intermediate which may also be used in manufacturing agricultural chemicals and pharmaceuticals.
Hexoic acid (caproic acid)	Triveni Chemicals, JK Chemicals	The primary use of hexanoic acid is in the manufacture of its esters for artificial flavours, and in the manufacture of hexyl derivatives, such as hexylphenols. The salts and esters of this acid are known as hexanoates or caproates.
Octoic acid (caprylic acid)	Otto Chemie Pvt, Vizag Chemicals	Caprylic acid works as an antioxidant for skin and boosts the antioxidants in skin products. It is also used in the form of an antimicrobial pesticide for surface sanitization in the food and dairy industry, and as disinfectant in some healthcare sectors and services.
Tri fluoro acetic acid	Sagar Life Sciences, Otto Chemie Pvt Ltd, Sisco Research Laboratories Pvt. Ltd, Sagar Life Sciences Private Limited, SRF Limited	TFA is the precursor to many other fluorinated compounds. It is a reagent used in organic synthesis because of a combination of convenient properties: volatility, solubility in organic solvents, and its strength as an acid. TFA is also less oxidizing than sulfuric acid but more readily available in anhydrous form than many other acids. One complication to its use is that TFA forms an azeotrope with water.
Ethyl difluoro acetate	Gujarat Fluorochemicals Limited, Jigs Chemical, SRF, Navin Fluorine	Ethyl difluoro acetate is used in pharmaceutical intermediates, acrylization oxidation and halogenating reaction of catalyst. Also, ethyl difluoro acetate is used in preparing pyrazolo-pyrimidine derivatives.
Ethyl trifluoro acetate	Otto Chemie Pvt Limited, Navin Fluorine, TCI Chemicals Private Limited, SRF	Ethyl trifluoroacetate is used as an intermediate in organic synthesis to prepare organic fluorine compounds like 3-ethyl-1-methylimidazolium trifluoroacetate (EMITA). It is involved in the syntheses of various pharmaceutically active molecules and agricultural products.
Acrylic acid and its salts	Atulya Chemicals, Chemex Chemicals	Acrylic acid is used mainly in the formation of polymers. Its uses include plastics, coatings, adhesives, elastomers, paints, and polishes. Additionally, acrylic acid is used in the production of hygienic medical products, detergents, and wastewater treatment chemicals.
Methacrylic acid and its salts:	Shree Mahalaxmi Chemicals, Maruti Chemicals, Triveni Chemicals	Mainly used in paints, adhesives, and leather treatment agents, methacrylic acid is also used as a raw material in the manufacture of ion-exchange resins.
Oleic, linoleic or linolenic acids, their salts and esters	Acme Synthetic Chemicals, Triveni Chemicals	Alpha-linolenic acid is popular for preventing and treating diseases of the heart and blood vessels. It is used to prevent heart attacks.
Undecylenic acid	Acme Synthetic Chemicals, Kalpsutra Chemicals Pvt., Ltd, Chemz Chem (India) P. Ltd	Undecylenic acid is a fatty acid that works by preventing fungus from growing on the skin. Undecylenic acid topical (for the skin) is used to treat skin infections that are caused by fungus, such as athlete's foot, jock itch, or ringworm.
Sorbic acid	Gujarat Enterprise, Asahi Chem, Triveni Chemicals, Advance Inorganics, Shriram Biochem, Antares Chem Private Limited	Sorbic acid is a naturally occurring compound that's become the most used food preservative in the world, and it makes the global food chain possible. It's highly effective at inhibiting the growth of mold, which can spoil food and spread fatal diseases.
Erucic acid	Acme Synthetic Chemicals	Erucic acid has many of the same uses as mineral oils, but it is more readily biodegradable than some. It has limited ability to polymerize and dry for use in oil paints. Like other fatty acids, it can be converted into surfactants or lubricants, and can be used as a precursor to biodiesel fuel.

SOURCES: INCRED CAPITAL

Halogenated derivatives of hydrocarbons

This section of chemicals is dependent on crude oil prices and hence, value of trade varies with underlying crude oil prices.

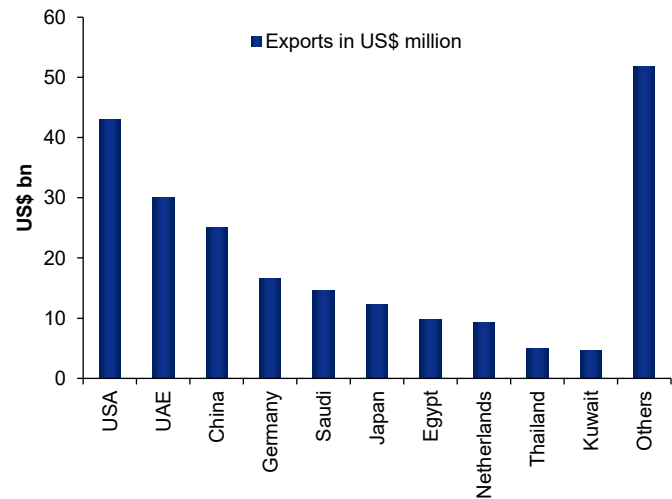
Figure 55: India's exports of halogenated derivatives of hydrocarbons are only around 2% of global trade; China had a 22% share in global trade during CY20



SOURCES: INCRED CAPITAL, TREND ECONOMY

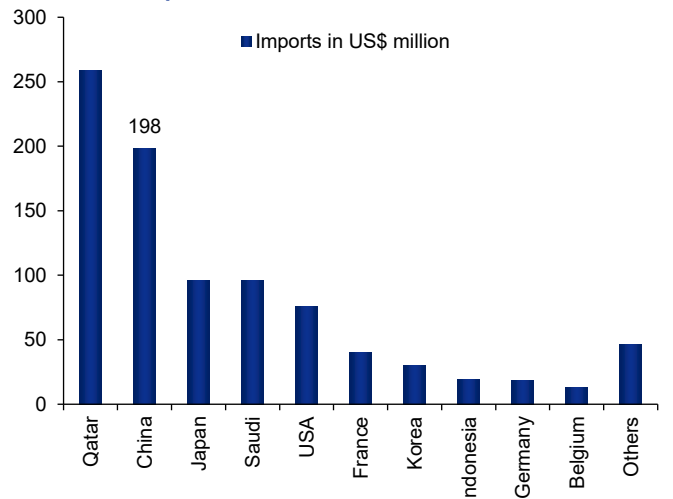
The story, is as usual, Indian imports from China amount to 90% of its total exports ➤

Figure 56: Overall halogenated hydrocarbon exports from India are US\$220m



SOURCES: INCRED CAPITAL, TREND ECONOMY

Figure 57: India's import from China alone are US\$198m or 90% of its overall exports



SOURCES: INCRED CAPITAL, TREND ECONOMY

India has several manufacturers of halogenated derivatives of hydrocarbons ➤

This chemistry skill is well developed in India and now it's up to the leaders like SRF, Navin Fluorine and Aarti Industries to do the import substitution.

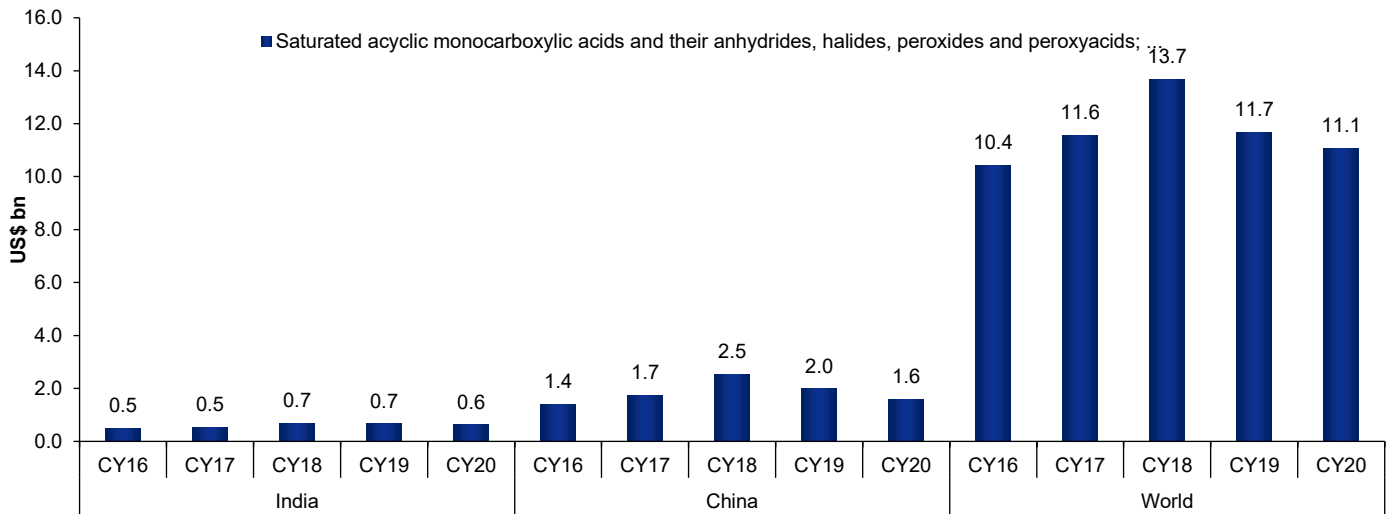
Figure 58: India has several manufacturers of halogenated derivatives of hydrocarbons

Halogenated Derivative of Hydrocarbons	Manufacturers
Chloromethane	GACL, Chemplast Sanmar, Gujarat Fluorochemicals.
Vinyl chloride (chloroethylene)	Reliance Industries.
Trichloroethylene	SRF, Ama Speciality India, Sova Chemicals, Curo Organics Limited, Chemtex Speciality Limited
Tetrachloroethylene (perchloroethylene)	Vizag Chemicals.
Brominated derivative	
Iodinated derivatives	
Chlorodifluoromethane	
Dichlorotrifluoroethanes	
Dichlorofluoroethanes	
Chlorodifluoroethanes	
Dichloropentafluoropropanes	
Bromochlorodifluoromethane, bromotrifluoromethane and dibromotetrafluoroethanes:	
Bromochlorodifluoromethane	
Bromotrifluoromethane	
Dibromotetrafluoroethanes	
Chlorofluoromethanes:	
Chlorotrifluoromethane	
Dichlorodifluoromethane	
Trichlorofluoromethane	
Chlorofluoroethanes:	Multiple Indian manufactures including SRF, Aarti Industries, Navin Fluorine etc.
Chloropentafluoroethane	
1,2- Dichlorotetrafluoroethane	
Trichlorotrifluoroethane	
Tetrachlorodifluoroethane	
Pentachlorofluoroethane	
Chlorofluoropropanes:	
Chloroheptafluoropropane	
Dichlorohexafluoropropane	
Trichloropentafluoropropane	
Tetrachlorotetrafluoropropane	
Pentachlorotrifluoropropane	
Hexachlorodifluoropropane	
Heptachlorofluoropropane	
Halogenated derivatives of cyclanic, cyclenic or cycloterpenic hydrocarbons:	
Halogenated derivatives of aromatic hydrocarbons:	
Derivatives containing only sulpho groups, salts and ethyl esters	

SOURCES: INCRED CAPITAL, TRENDECONOMY

Saturated acyclic monocarboxylic acids and their anhydrides, halides, peroxides and peroxyacids

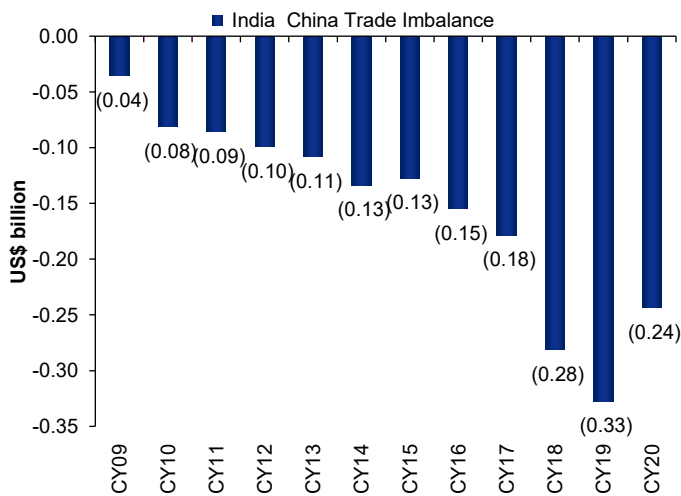
Figure 59: India exports US\$600m worth of saturated acyclic monocarboxylic acids and it has a 5% share in global export market, whereas China has a 15% share



SOURCES: INCRED CAPITAL, TRENDECONOMY

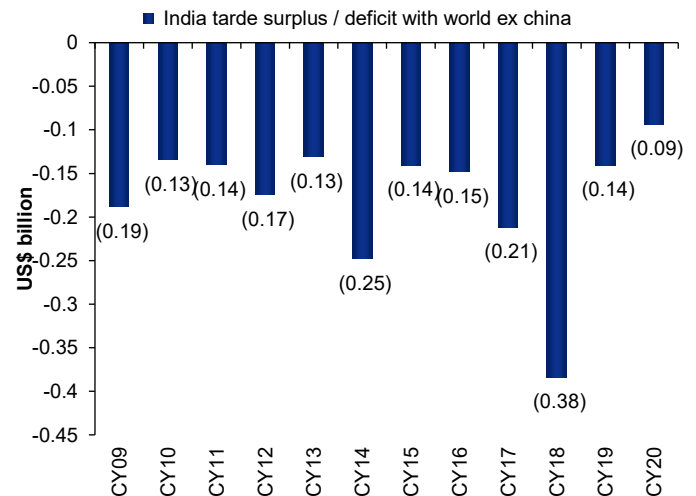
As usual, India runs a trade deficit with China in this chemical class as well ➤

Figure 60: In such a basic chemical class as well, India runs US\$240m trade deficit with China



SOURCES: INCRED CAPITAL, TRENDECONOMY

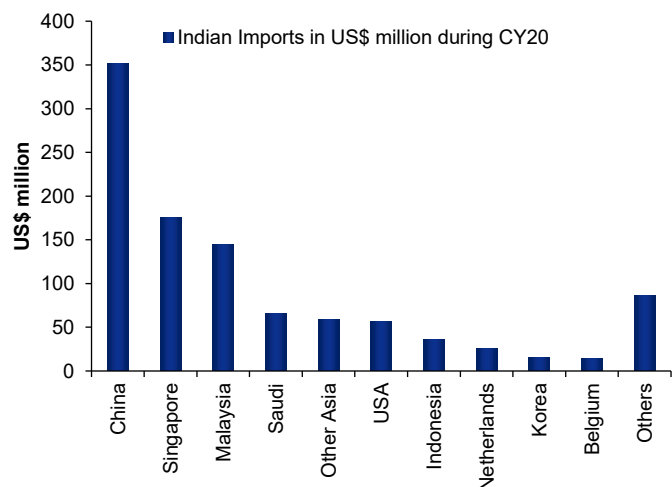
Figure 61: Trade deficit with RoW, ex-China, is around US\$90m



SOURCES: INCRED CAPITAL, TRENDECONOMY

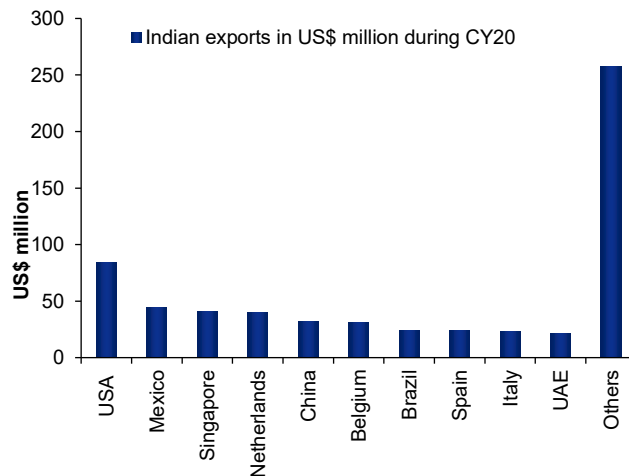
India exports mainly to the western world and it imports primarily from China ➤

Figure 62: China exports US\$352m worth of saturated acyclic monocarboxylic acids and its salts to India



SOURCES: INCRED CAPITAL, TREND ECONOMY

Figure 63: India's exports of such basic compound are only US\$600m



SOURCES: INCRED CAPITAL, TREND ECONOMY

Is there a case for import substitution and replacing Chinese imports in Indian market? Yes, there is ➤

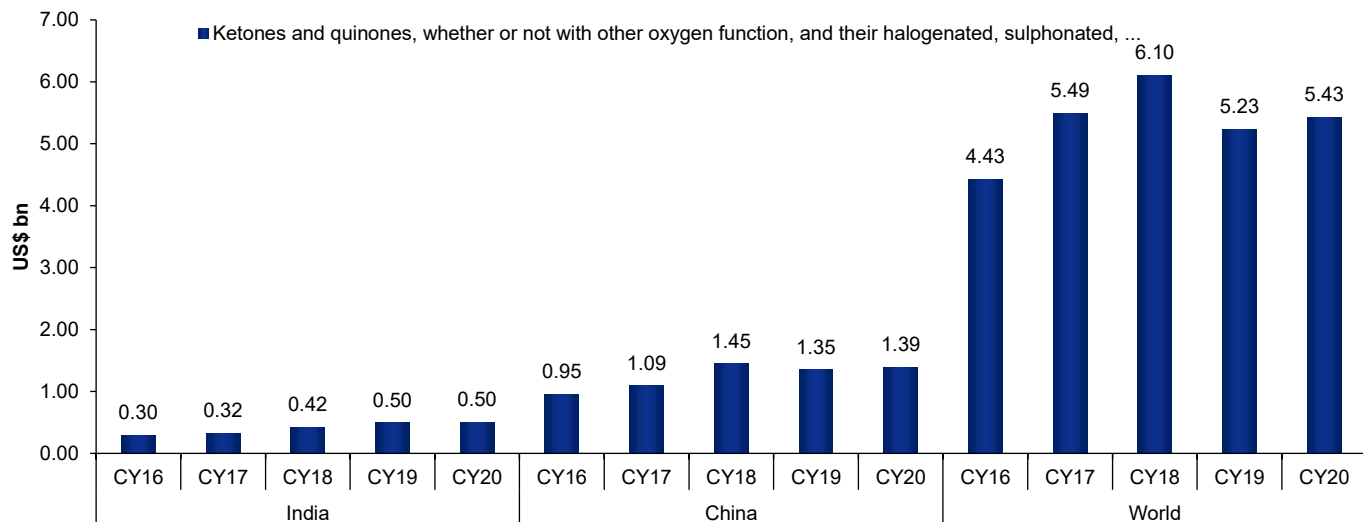
Figure 64: Most chemicals in the saturated acyclic monocarboxylic acids class are manufactured by unlisted companies

Name of chemical	Manufacturer
Formic acid, its salts and esters	Ennore Chemicals, RX Chemicals.
Acetic acid and its salts; acetic anhydride	Laxmi organics, Jubilant Ingrevia.
Esters of acetic acid	Laxmi organics, Jubilant Ingrevia.
Ortho tertiary butyl cyclohexyl acetate	Kalpsutra Chemical, Eternis Chemicals.
Para tertiary butyl cyclohexyl acetate	Kalpsutra Chemical, Eternis Chemicals.
Methyl cyclohexyl acetate	Indo Amines Limited, Atul limited, Hindustan Organics Limited,
Ethylene glycol mono ethyl ether acetate	India Glycols, Triveni Chemicals.
Mono, di or trichloroacetic acids, their salts and esters	Otto Kemi Chemicals, Sujan Chemicals, Belami Chemicals, Explicit Chemicals private limited, Sisco research Laboratories.
Propionic acid, its salts and esters	Otto Kemi Chemicals, Vizag Chemicals, Chemex Chemicals, Dr. Reddy's Laboratories Ltd, Noble Industries, RBN Organics, Indo Amines.
Butanoic acids, pentanoic acids, their salts and esters	Best Value Chem, Jigs chemicals, Saanvi Corporation, Triveni Chemicals, RS Chemicals LLP, Vizag Chemicals, Samex Overseas.
Palmitic acid, stearic acid, their salts and esters	Acme Synthetic Chemicals, Suyog Life Sciences, Godrej Industries, Shree Chem Exports Private Limited, Standard Surfa Chem India Pvt Ltd, Sankalp Organics.
Glycerol monostearate	Mohini Organics, Ultima Chemicals, Alpha Chemika, Nirma Chemicals, Acuro.
Acetyl chloride	Om Organics Chemicals, Desai Specialty, Mash Organics, RadianT Impex, Ultimate Chem India, Chemit Laboratories, Shiva Pharmchem.
Pivaloyl chloride	Vav Life Sciences Private Limited, Triveni Chemicals, Shreeji Chemical Industries.
Nvaleryl chloride	OC Specialities Chemical, Shital Chemical Industries, Gujarat Industrial Chemicals.
Noctanoyl chloride	Bharat Rasayan, Shiva Pharma Chem,
Neodecanoyl chloride	Shiva Pharma Chem, AVA Chemicals Private Limited.
Hexoic acid (caproic acid)	Ethidrugs Research Lab Private Limited, Saanvi Corp, Triveni Chemicals, Acme Synthetic Chemicals.
Octoic acid (caprylic acid)	Ethidrugs Research Lab Private Limited, Saanvi Corp, Triveni Chemicals, Acme Synthetic Chemicals.
Tri fluoro acetic acid	Triveni Chemicals, Vizag Chemicals, Sagar Life Sciences, Alpha Chemika.
Ethyl difluoro acetate	Gujarat Fluorochemicals Limited.
Ethyl trifluoro acetate	Gujarat Fluorochemicals Limited.

SOURCES: INCRED CAPITAL, TREND ECONOMY

Ketones and quinones

Figure 65: India's exports stand at US\$500m, which is 9% of overall global exports; China's exports are approximately 3x India's exports



SOURCES: INCRED CAPITAL, TRENDECONOMY

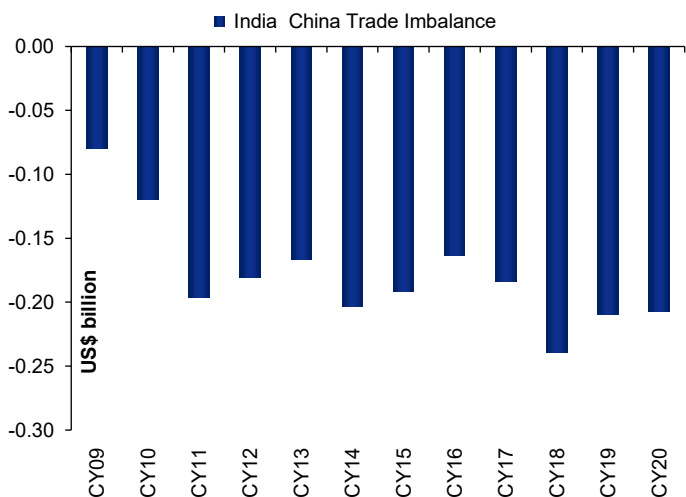
What are ketones and quinones? ➤

Quinones are a class of organic compounds that are formally "derived from aromatic compounds by conversion of an even number of –CH= groups into –C(=O)– groups with any necessary rearrangement of double bonds, resulting in "a fully conjugated cyclic dione structure". The archetypical member of the class is 1,4-benzoquinone or cyclohexadienedione, often called simply "quinone" (thus, the name of the class).

Ketone is any class of organic compounds characterized by the presence of a carbonyl group in which the carbon atom is covalently bonded to an oxygen atom. The remaining two bonds are to other carbon atoms. Ketone compounds have important physiological properties. They are found in several sugars and in compounds for medicinal use, including natural and synthetic steroid hormones.

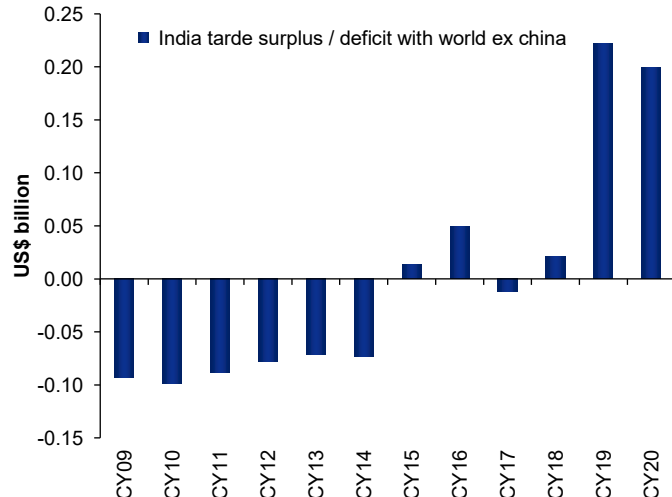
India's trade balance is negative with China, but is positive with rest of the world ➤

Figure 66: India runs a negative trade balance with China in ketone and quinone categories



SOURCES: INCRED CAPITAL, TRENDECONOMY

Figure 67: However, with RoW India runs a positive trade balance



SOURCES: INCRED CAPITAL, TRENDECONOMY

The chemicals in this class are manufactured by several Indian companies ➤

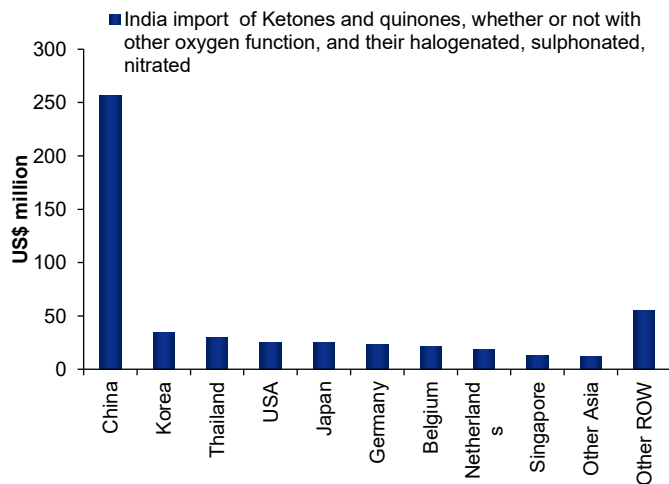
Figure 68: There are multiple manufacturers in India who can make all these classes of chemicals

Name of Chemicals	Manufacturers
Acetone	Deepak Nitrite, Dhanlaxhmi Organic Chemicals, Fine Chemicals, Hwatsi Chemical Pvt Ltd, Galaxy Chemicals.
Butanone (methyl ethyl ketone)	Ennore Chemicals, Vizag Chemicals, Taj Pharmaceuticals.
Methyl isobutyl ketone	Dhanlaxhmi Organics, Otto Kemi Pvt Limited, Rex Chemicals, Dhalop Chemicals.
Isophoron	Prasol Chemicals Ltd, Noble Industries, Anupam Chemicals.
Cyclohexanone and methylcyclohexanones	Triveni Chemical, Shree Ganesh Chemicals.
Ionones and methylionones	Privi Chemicals, Hindustan Mint and Agro products Limited.
Betaionone	Privi Chemicals, Karnataka Aromas, Aayan Industries.
Pseudo ionone	Privi Chemicals, Mubychem Group.
L-caravone	Kavya Pharma, Triveni Chemicals.
Camphor	Multiple Indian companies.
Pentyl-2-cyclopenten-1-one	
Cyclohexane dione	Shodhana Laboratories Limited, Somu Group.
Phenylacetone	
Aceto phenone	Val Organics, Surya Life Sciences Ltd, Meru Chem Pvt. Ltd, Clean Sciences.
Benzanthrone	Deesha Organic Private Limited.
Benzophenone	J N Chemicals, Vindhaya Pharma India, Bharat Rasayan.
Ketonealcohols and ketonealdehydes	Otto Chemie Private Limited, NitiChem Pvt Limited, Concorde Chemicals.
Quinones	Chem Pharma Impex, TCI Chemicals.
Anthraquinone	Triveni Chemicals, NRS Chemicals LLP.
1,4 dihydroxy anthraquinone (quinizarin)	Otto Chemie Private Limited.

SOURCES: INCRED CAPITAL, TRENDECONOMY

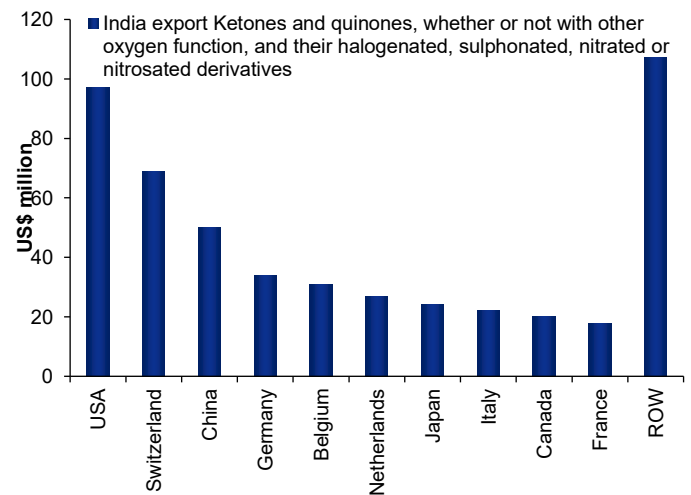
India may not have a big potential in supplying to other countries, but replacing China in local market is a big opportunity ➤

Figure 69: China exports approximately US\$260m of ketones and quinones to India



SOURCES: INCRED CAPITAL, TRENDECONOMY

Figure 70: India's biggest export market is the US



SOURCES: INCRED CAPITAL, TRENDECONOMY

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Description:	Excellent	Very Good	Good	N/A	N/A

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Corporate Governance Report of Thai Listed Companies (CGR). CG Rating by the Thai Institute of Directors Association (Thai IOD) in 2020, Anti-Corruption 2020

ADVANC – Excellent, Certified, **AMATA** – Excellent, Certified, **ANAN** – Excellent, n/a, **AOT** – Excellent, n/a, **AP** – Excellent, Certified, **ASP** – Excellent, n/a, **AU** – Good, n/a, **BAM** – Very Good, Certified, **BAY** – Excellent, Certified, **BBL** – Very Good, Certified, **BCH** – Good, Certified, **BCP** – Excellent, Certified, **BCPG** – Excellent, Certified, **BDMS** – Excellent, n/a, **BEAUTY** – Good, n/a, **BH** – Good, n/a, **BJC** – Very Good, n/a, **BLA** – Excellent, Certified, **BTS** – Excellent, Certified, **CBG** – Very Good, n/a, **CCET** – n/a, n/a, **CENTEL** – Excellent, Certified, **CHAYO** – Very Good, n/a, **CHG** – Very Good, n/a, **CK** – Excellent, n/a, **COM7** – Very Good, Certified, **CPALL** – Excellent, Certified, **CPF** – Excellent, Certified, **CPN** – Excellent, Certified, **CPNREIT** – n/a, n/a, **CRC** – Very Good, n/a, **DELTA** – Excellent, Certified, **DDD** – Very Good, n/a, **DIF** – n/a, n/a, **DOHOME** – Very Good, n/a, **DREIT** – n/a, n/a, **DTAC** – Excellent, Certified, **ECL** – Excellent, Certified, **EGCO** – Excellent, Certified, **EPG** – Excellent, Certified, **ERW** – Very Good, Certified, **GFPT** – Excellent, Certified, **GGC** – Excellent, Certified, **GLOBAL** – Very Good, n/a, **HANA** – Excellent, Certified, **HMPRO** – Excellent, Certified, **HUMAN** – Good, n/a, **ICHI** – Excellent, Certified, **III** – Excellent, n/a, **INTUCH** – Excellent, Certified, **IRPC** – Excellent, Certified, **ITD** – Very Good, n/a, **IVL** – Excellent, Certified, **JASIF** – n/a, n/a, **JKN** – Excellent, Declared, **JMT** – Very Good, Declared, **KBANK** – Excellent, Certified, **KCE** – Excellent, Certified, **KEX** – n/a, n/a, **KKP** – Excellent, Certified, **KSL** – Excellent, Certified, **KTB** – Excellent, Certified, **KTC** – Excellent, Certified, **LH** – Excellent, n/a, **LPN** – Excellent, Certified, **M** – Very Good, Certified, **MAKRO** – Excellent, Certified, **MC** – Excellent, Certified, **MEGA** – Very Good, n/a, **MINT** – Excellent, Certified, **MTC** – Excellent, Certified, **NETBAY** – Very Good, n/a, **NRF** – n/a, n/a, **OR** – n/a, n/a, **ORI** – Excellent, Certified, **OSP** – Very Good, n/a, **PLANB** – Excellent, Certified, **PRINC** – Very Good, Certified, **PR9** – Excellent, n/a, **PSH** – Excellent, Certified, **PTT** – Excellent, Certified, **PTTEP** – Excellent, Certified, **PTTGC** – Excellent, Certified, **QH** – Excellent, Certified, **RBF** – Good, n/a, **RS** – Excellent, n/a, **RSP** – Good, n/a, **S** – Excellent, n/a, **SAK** – n/a, n/a, **SAPPE** – Very Good, Certified, **SAWAD** – Very Good, n/a, **SCB** – Excellent, Certified, **SCC** – Excellent, Certified, **SCGP** – n/a, n/a, **SHR** – Very Good, n/a, **SIRI** – Excellent, Certified, **SPA** – Very Good, n/a, **SPALI** – Excellent, Declared, **SPRC** – Excellent, Certified, **SSP** – Good, Declared, **STEC** – n/a, n/a, **SVI** – Excellent, Certified, **SYNEX** – Very Good, n/a, **TCAP** – Excellent, Certified, **THANI** – Excellent, Certified, **TIDLOR** – n/a, n/a, **TISCO** – Excellent, Certified, **TKN** – Very Good, n/a, **TMB** – Excellent, Certified, **TOP** – Excellent, Certified, **TRUE** – Excellent, Certified, **TU** – Excellent, Certified, **TVO** – Excellent, Certified, **VGI** – Excellent, Certified, **WHA** – Excellent, Certified, **WHART** – n/a, n/a, **WICE** – Excellent, Certified, **WORK** – Good, n/a.

- CG Score 2020 from Thai Institute of Directors Association (IOD)

- Companies participating in Thailand's Private Sector Collective Action Coalition Against Corruption programme (Thai CAC) under Thai Institute of Directors (as of January 30, 2021) are categorised into: companies that have declared their intention to join CAC, and companies certified by CAC.

Recommendation Framework

Stock Ratings

Definition:

Add	The stock's total return is expected to exceed 10% over the next 12 months.
Hold	The stock's total return is expected to be between 0% and positive 10% over the next 12 months.
Reduce	The stock's total return is expected to fall below 0% or more over the next 12 months.

The total expected return of a stock is defined as the sum of the: (i) percentage difference between the target price and the current price and (ii) the forward net dividend yields of the stock. Stock price targets have an investment horizon of 12 months.

Sector Ratings

Definition:

Overweight	An Overweight rating means stocks in the sector have, on a market cap-weighted basis, a positive absolute recommendation.
Neutral	A Neutral rating means stocks in the sector have, on a market cap-weighted basis, a neutral absolute recommendation.
Underweight	An Underweight rating means stocks in the sector have, on a market cap-weighted basis, a negative absolute recommendation.

Country Ratings

Definition:

Overweight	An Overweight rating means investors should be positioned with an above-market weight in this country relative to benchmark.
Neutral	A Neutral rating means investors should be positioned with a neutral weight in this country relative to benchmark.
Underweight	An Underweight rating means investors should be positioned with a below-market weight in this country relative to benchmark.