

Research Report on Speciality Fine Chemicals Industry

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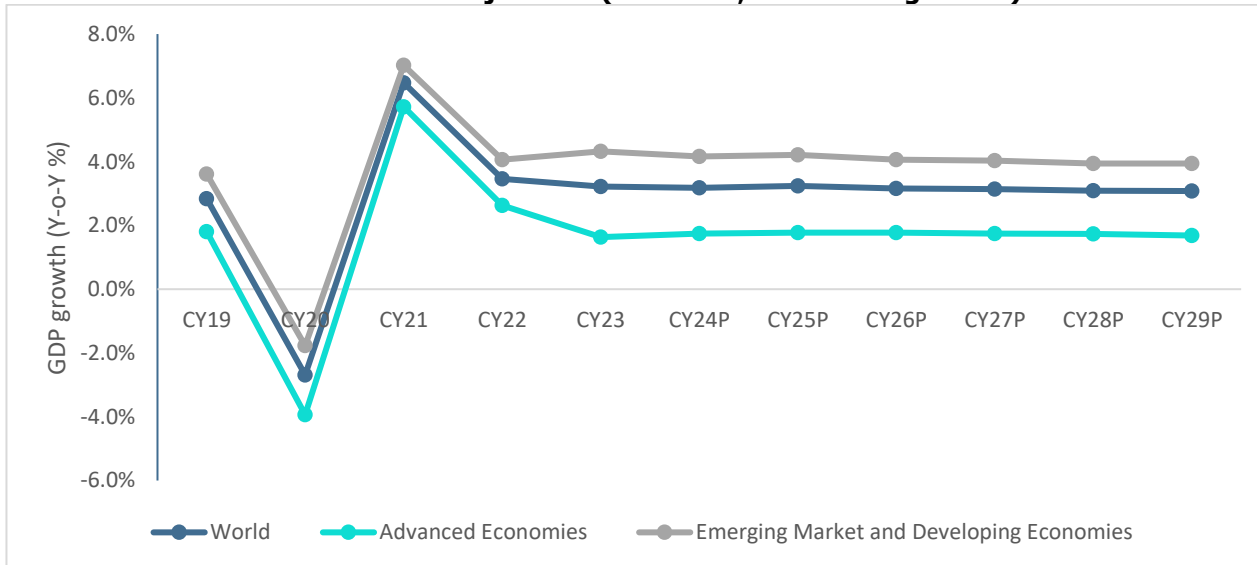
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1 Economic Outlook

1.1 Global Economy

Global growth, which stood at 3.2% in CY23, is anticipated to maintain this rate throughout CY24 and CY25. The CY24 forecast has been adjusted upwards by 0.1 percentage point compared to the January 2024 World Economic Outlook (WEO) Update, and by 0.3 percentage point compared to the October 2023 WEO. Despite this, the expansion remains historically low, attributed to factors including sustained high borrowing costs, reduced fiscal support, lingering effects of the COVID-19 pandemic and Russia’s Ukraine invasion, sluggish productivity growth, and heightened geo-economics fragmentation.

Chart 1: Global Growth Outlook Projections (Real GDP, Y-o-Y change in %)



Notes: P-

Projection; Source: IMF – World Economic Outlook, April 2024

Table 1: GDP growth trend comparison - India v/s Other Economies (Real GDP, Y-o-Y change in %)

| | Real GDP (Y-o-Y change in %) | | | | | | | | | |
|---------------|------------------------------|------|------|------|-------|-------|-------|-------|-------|-------|
| | CY20 | CY21 | CY22 | CY23 | CY24P | CY25P | CY26P | CY27P | CY28P | CY29P |
| India | -5.8 | 9.7 | 7.0 | 7.8 | 6.8 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 |
| China | 2.2 | 8.5 | 3.0 | 5.2 | 4.6 | 4.1 | 3.8 | 3.6 | 3.4 | 3.3 |
| Indonesia | -2.1 | 3.7 | 5.3 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 |
| Saudi Arabia | -3.6 | 5.1 | 7.5 | -0.8 | 2.6 | 6.0 | 4.0 | 3.5 | 3.0 | 3.5 |
| Brazil | -3.3 | 4.8 | 3.0 | 2.9 | 2.2 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 |
| Euro Area | -6.1 | 5.9 | 3.4 | 0.4 | 0.8 | 1.5 | 1.4 | 1.3 | 1.3 | 1.2 |
| United States | -2.2 | 5.8 | 1.9 | 2.5 | 2.7 | 1.9 | 2.0 | 2.1 | 2.1 | 2.1 |

P- Projections; Source: IMF- World Economic Outlook Database (April 2024)

Advanced Economies Group

Advanced economies are expected to experience a gradual increase in growth, climbing from 1.6 % in CY23 to 1.7% in CY24 and further to 1.8% in CY25. The projection for CY24 has been adjusted upwards by 0.2 percentage points compared to the January CY24 WEO Update, while the forecast for CY25 remains unchanged. This adjustment primarily reflects a revision in US growth, compensating for a slight downward revision in the euro area for CY25.

The **United States** is expected to see growth rise to 2.7% in CY24, followed by a slight slowdown to 1.9% in CY25. This deceleration is attributed to gradual fiscal tightening and labor market softening, which dampen aggregate demand. The CY24 projection has been revised upward by 0.6 percentage points since the January CY24 WEO Update. This revision primarily reflects carryover effects from stronger-than-expected growth in the fourth quarter of CY23, with some of this momentum expected to continue into CY24.

The **Euro Area's** growth is anticipated to rebound from its sluggish rate of 0.4% in CY23, mainly influenced by significant exposure to the conflict in Ukraine. Projections indicate an increase to 0.8% in CY24 and further to 1.5% in CY25. This recovery is driven by stronger household consumption, as the impact of elevated energy prices diminishes and declining inflation bolsters real income growth. Despite a downward revision of 0.3 percentage points for Germany in both CY24 and CY25 due to persistent weak consumer sentiment, this adjustment is largely balanced by upgrades for several smaller economies, including Belgium and Portugal.

Emerging Market and Developing Economies Group

Emerging market and developing economies are forecasted to maintain stable growth at 4.2% in both CY24 and CY25. While there's a slowdown expected in emerging and developing Asia, this is counterbalanced by increasing growth in economies across the Middle East, Central Asia, and sub-Saharan Africa. Low-income developing countries are anticipated to experience a gradual growth uptick, starting at 4.0% in CY23 and climbing to 4.7% in CY24 and 5.2% in CY25, as certain constraints on near-term growth begin to ease.

The economic forecast for emerging and developing Asia reveals a modest deceleration in growth, with projections indicating a decline from 5.6% in CY23 to 5.2% in CY24 and 4.9% in CY25. **China's** trajectory reflects a slowdown, transitioning from 5.2% in CY23 to 4.6% in CY24 and 4.1% in CY25 due to fading post-pandemic stimuli and ongoing property sector challenges. In contrast, **India's** growth remains robust, with anticipated rates of 6.8% in CY24 and 6.5% in CY25, bolstered by resilient domestic demand and a burgeoning working-age populace.

The **Indonesian** economy is expected to register growth of 5.0% in CY24 and 5.1% in CY25 with a strong domestic demand, a healthy export performance, policy measures, and normalization in commodity prices. In CY22, **Saudi Arabia's** growth slowed at -0.8% in CY23 attributed to lower oil production. CY24 is predicted to see a revamp in the growth rates to 2.6% on account of Vision 2030 reforms that helped advance the country's economic diversification agenda, including through reduced reliance on oil. Going forward, GDP is expected to grow at 6.0% and 4.0% in CY25 and CY26, respectively. On the other hand, **Brazil's** growth is projected to ease to 2.2% in CY24, driven by fiscal consolidation, the lingering impact of tight monetary policies, and reduced contributions from the agricultural sector.

Despite the turmoil in the last 2-3 years, India bears good tidings to become a USD 5 trillion economy by CY27. According to the IMF dataset on Gross Domestic Product (GDP) at current prices, the nominal GDP has been estimated to be at USD 3.6 trillion for CY23 and is projected to reach USD 5.3 trillion by CY27 and USD 6.4 trillion by CY29. India's expected GDP growth rate for coming years is almost double compared to the world economy.

Besides, India stands out as the fastest-growing economy among the major economies. The country is expected to grow at more than 6.5% in the period of CY24-CY29, outshining China's growth rate. By CY27, the Indian economy is estimated to emerge as the third-largest economy globally, hopping over Japan and Germany. Currently, it is the third-largest economy globally in terms of Purchasing Power Parity (PPP) with a ~7.6% share in the global economy, with China [~18.7%] on the top followed by the United States [~15.6%]. Purchasing Power Parity is an economic performance

indicator denoting the relative price of an average basket of goods and services that a household needs for livelihood in each country.

Despite Covid-19's impact, high inflationary environment and interest rates globally, and the geopolitical tensions in Europe, India has been a major contributor to world economic growth. India is increasingly becoming an open economy as well through growing foreign trade. Despite the global inflation and uncertainties, Indian economy continues to show resilience. This resilience is mainly supported stable financial sector backed by well-capitalized banks and export of services in trade balance. With this, the growth of Indian economy is expected to fare better than other economies majorly on account of strong investment activity bolstered by the government's capex push and buoyant private consumption, particularly among higher income earners.

1.2 Indian Economic Outlook

1.2.1 GDP Growth and Outlook

Resilience to External Shocks remains Critical for Near-Term Outlook

India's real GDP grew by 7.0% in FY23 and stood at ~Rs. 161 trillion despite the pandemic in previous years and geopolitical Russia-Ukraine spillovers. In Q1FY24, the economic growth accelerated to 8.2%. The manufacturing sector maintained an encouraging pace of growth, given the favorable demand conditions and lower input prices. The growth was supplemented by a supportive base alongside robust services and construction activities. This momentum remained in the range in the Q2FY24 with GDP growth at 8.1%, mainly supported by acceleration in investments. However, private consumption growth was muted due to weak rural demand and some moderation in urban demand amid elevated inflationary pressures in Q2FY24.

India's GDP at constant prices surged to Rs. 43.72 trillion in Q3FY24 from Rs. 40.35 trillion in Q3FY23, marking an 8.4% growth rate. This upswing was fueled by robust performances in construction, mining & quarrying, and manufacturing sectors and investment drove the GDP growth, while both private and government consumption remained subdued. In 9MFY24, GDP surged by 8.2% to Rs. 126 trillion compared to 7.3% in the previous year largely due to increase in investments and growth in domestic demand (investment growth increased 10.6% y-o-y while private consumption was 3.5% higher).

Real GDP in the year FY24 is estimated to grow at 7.6% at Rs. 172.90 trillion as per second advance estimate of the Ministry of Statistics and Programme Implementation. It is expected that domestic demand, especially investment, to be the main driver of growth in India, amid sustained levels of business and consumer confidence.

GDP Growth Outlook

- Driven by resilience in urban demand and the front loading of the government's capital expenditure, the H1FY24 witnessed a strong growth. Thereafter Q3 was propelled by strong performances in sectors like construction, mining & quarrying, and manufacturing.
- The recent announcements of various relief measures such as LPG price reduction and extension of Pradhan Mantri Garib Kalyan Anna Yojna (PMGKAY) are expected to provide some cushion and so far, investment demand has remained robust. However, there could be some moderation in H2FY24 as both the government and private sector

may restrain their capital spending ahead of the general elections. Despite some expected moderation in the H2FY24, India’s overall GDP growth for FY24 is expected to remain on a firm footing. In terms of fiscal deficit for the year, the Finance Ministry has estimated it to be at 5.1% of GDP.

- Strong credit growth, resilient financial markets, and the government’s continual push for capital spending and infrastructure are likely to create a compatible environment for investments. In the Interim Budget 2024-25, significant emphasis is placed on infrastructure development with an increased capital expenditure outlay of Rs. 11,11,111 crores, amounting to 3.4% of the GDP.
- External demand is likely to remain subdued with a slowdown in global activities, thereby indicating adverse implications for exports. Additionally, heightened inflationary pressures and resultant policy tightening may pose a risk to the growth potential.

Prior to the Interim Budget, in December 2023, the RBI in its bi-monthly monetary policy meeting estimated a real GDP growth of 7% y-o-y for FY24 comparatively lower from MoSPI’s estimate of 7.6%.

Table 2: RBI's GDP Growth Outlook (Y-o-Y %)

| FY25P (complete year) | Q4FY24P | Q1FY25P | Q2FY25P | Q3FY25P | Q4FY25P |
|--------------------------|---------|---------|---------|---------|---------|
| 7.0% | 6.5% | 7.2% | 6.8% | 7.0% | 6.9% |

Note: P-Projected; Source: Reserve Bank of India

1.2.2 Gross Value Added (GVA)

Gross Value Added (GVA) is the measure of the value of goods and services produced in an economy. GVA gives a picture of the supply side whereas GDP represents consumption.

Industry and Services sector leading the recovery charge

- The gap between GDP and GVA growth turned positive in FY22 (after a gap of two years) due to robust tax collections. Of the three major sector heads, the service sector has been the fastest-growing sector in the last 5 years.
- The **agriculture sector** was holding growth momentum till FY18. In FY19, the acreage for the rabi crop was marginally lower than the previous year which affected the agricultural performance. Whereas FY20 witnessed growth on account of improved production. During the pandemic-impacted period of FY21, the agriculture sector was largely insulated as timely and proactive exemptions from COVID-induced lockdowns to the sector facilitated uninterrupted harvesting of rabi crops and sowing of kharif crops. However, supply chain disruptions impacted the flow of agricultural goods leading to high food inflation and adverse initial impact on some major agricultural exports. However, performance remained steady in FY22.

In FY23, the agriculture sector performed well despite weather-related disruptions, such as uneven monsoon and unseasonal rainfall, impacting yields of some major crops and clocked a growth of 4% y-o-y, garnering Rs. 22.3 trillion.

In Q1FY24, this sector expanded at a slower pace of 3.5% y-o-y growth compared to y-o-y growth a quarter ago. This further stumbled to 1.2% in Q2FY24. Further, it experienced contraction of 0.8% in Q3, leading to expectations of a modest 0.7% rise for the full year, contrasting sharply with the 4.7% growth recorded in FY23. In the Interim Budget

2024-25, the government plans to boost private and public investment in post-harvest activities and expand the application of Nano-DAP across agro-climatic zones. Strategies for self-reliance in oilseeds and dairy development are to be formulated, alongside ramping up the Pradhan Mantri Matsya Sampada Yojana and establishing Integrated Aquaparks. Allocation for PM-Formalisation of Micro Food Processing Enterprises scheme has increased from Rs. 639 in FY24 to Rs. 880 crores in FY25.

Going forward, rising bank credit to the sector and increased exports will be the drivers for the agriculture sector. However, a deficient rainfall may have impact on the reservoir level, weighing on prospects of Kharif sowing. Considering these factors, the agriculture sector is estimated to attain Rs. 22.7 trillion and mark 1.8% y-o-y growth for complete FY24.

- The **industrial sector** witnessed a CAGR of 4.7% for the period FY16 to FY19. From March 2020 onwards, the nationwide lockdown due to the pandemic significantly impacted industrial activities. In FY20 and FY21, this sector felt turbulence due to the pandemic and recorded a decline of 1.4% and 0.9%, respectively, on a y-o-y basis. With the opening up of the economy and resumption of industrial activities, it registered 11.6% y-o-y growth in FY22, albeit on a lower base.

The industrial output in FY23 grew by 4.4% with estimated value Rs. 45.2 trillion owing to a rebound in manufacturing activities and healthy growth in the construction sector.

The industrial sector grew by 5.5% in Q1FY24, while Q2FY24 growth was up by 13.2% owing to positive business optimism and strong growth in new orders supported manufacturing output. The industrial growth was mainly supported by sustained momentum in the manufacturing and construction sectors. Within manufacturing, industries such as pharma, motor vehicles, metals, petroleum and pharma witnessed higher production growth during the quarter. The construction sector (13% growth in Q2FY24) benefited from poor rainfall during August and September and higher implementation of infrastructure projects. This was reflected in robust cement and steel production and power demand in Q2FY24. Overall, H1FY24 picked up by 9.3% with manufacturing and construction activities witnessing significant acceleration. In Q3FY24, growth rate slowed down to 10.4%.

India's industrial sector is experiencing strong growth, driven by significant expansion in manufacturing, mining, and construction. This growth is supported by positive business sentiment, declining commodity prices, beneficial government policies like production-linked incentive schemes, and efforts to boost infrastructure development. These factors collectively contribute to the sustained buoyancy in industrial growth due to which the industrial growth is estimated at 7.9% on y-o-y basis registering the value of Rs. 48.9 trillion in FY24.

- The **Services sector** recorded a CAGR of 7.1% for the period FY16 to FY20, which was led by trade, hotels, transport, communication, and services related to broadcasting, finance, real estate, and professional services. This sector was the hardest hit by the pandemic and registered an 8.2% y-o-y decline in FY21. The easing of restrictions aided a fast rebound in this sector, with 8.8% y-o-y growth witnessed in FY22.

Overall, in FY23, benefitting from the pent-up demand, the service sector was valued at Rs. 20.6 trillion and registered growth of 9.5% y-o-y.

In Q1FY24, the services sector growth jumped to 10.3%. Within services, there was a broad-based improvement in growth across different sub-sectors. However, the sharpest jump was seen in financial, real estate, and professional services. Trade, hotels, and transport sub-sectors expanded at a healthy pace gaining from strength in discretionary demand. The service sector growth in Q2FY24 moderated to 5.8% partly due to the normalization of base effect and some possible dilution in discretionary demand. Considering these factors, service sector marked 8% growth in H1FY24. In Q3FY24 growth slowed to 6.7% compared to 9.7% last year in the same quarter.

With this performance, steady growth in various service sector indicators like air passenger traffic, port cargo traffic, GST collections, and retail credit are expected to support the services sector. With this, the growth of service sector is estimated at Rs. 86.2 trillion registering 7.7% growth in FY24 overall.

Table 3: Sectoral Growth (Y-o-Y % Growth) - at Constant Prices

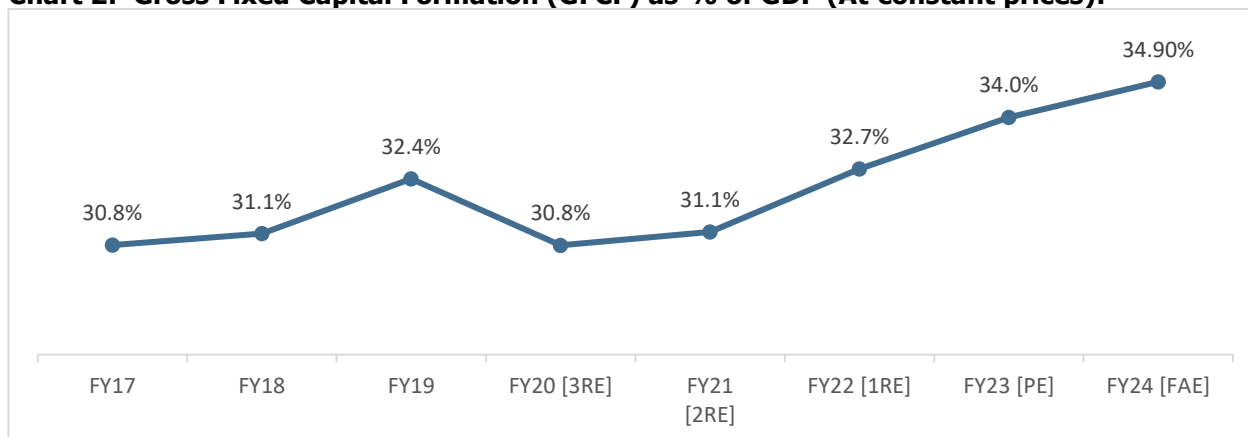
| At constant Prices | FY19 | FY20 | FY21 | FY22 | FY23 | FY24 |
|---|------------|-------------|-------------|-------------|------------|------------|
| | | | | (FRE) | (PE) | (FAE) |
| Agriculture, Forestry & Fishing | 2.1 | 6.2 | 4.1 | 3.5 | 4.0 | 1.8 |
| Industry | 5.3 | -1.4 | -0.9 | 11.6 | 4.4 | 7.9 |
| Mining & Quarrying | -0.9 | -3.0 | -8.6 | 7.1 | 4.6 | 8.1 |
| Manufacturing | 5.4 | -3.0 | 2.9 | 11.1 | 1.3 | 6.5 |
| Electricity, Gas, Water Supply & Other Utility Services | 7.9 | 2.3 | -4.3 | 9.9 | 9.0 | 8.3 |
| Construction | 6.5 | 1.6 | -5.7 | 14.8 | 10.0 | 10.7 |
| Services | 7.2 | 6.4 | -8.2 | 8.8 | 9.5 | 7.7 |
| Trade, Hotels, Transport, Communication & Broadcasting | 7.2 | 6.0 | -19.7 | 13.8 | 14.0 | 6.3 |
| Financial, Real Estate & Professional Services | 7.0 | 6.8 | 2.1 | 4.7 | 7.2 | 8.9 |
| Public Administration, Defence and Other Services | 7.5 | 6.6 | -7.6 | 9.7 | 7.2 | 7.7 |
| GVA at Basic Price | 5.8 | 3.9 | -4.2 | 8.8 | 7.0 | 6.9 |

Note: FRE – First Revised Estimates, PE – Provisional Estimate, FAE – First Advance Estimate; Source: MOSPI

1.2.3 Investment Trend in Infrastructure

Gross Fixed Capital Formation (GFCF), which is a measure of the net increase in physical assets, witnessed an improvement in FY22. As a proportion of GDP, it is estimated to be at 32.7%, which is the second-highest level in 7 years (since FY15). In FY23, the ratio of investment (GFCF) to GDP climbed up to its highest in the last decade at 34%. Continuing in its growth trend, this ratio is expected to reach 34.9% in FY24.

Chart 2: Gross Fixed Capital Formation (GFCF) as % of GDP (At constant prices):



Note: 3RE – Third Revised Estimate, 2RE – Second Revised Estimates, 1RE – First Revised Estimates, PE – Provisional Estimate, FAE-First Advance Estimate; Source: MOSPI

Overall, the support of public investment in infrastructure is likely to gain traction due to initiatives such as Atmanirbhar Bharat, Make in India, and Production-linked Incentive (PLI) scheme announced across various sectors.

1.2.4 Industrial Growth

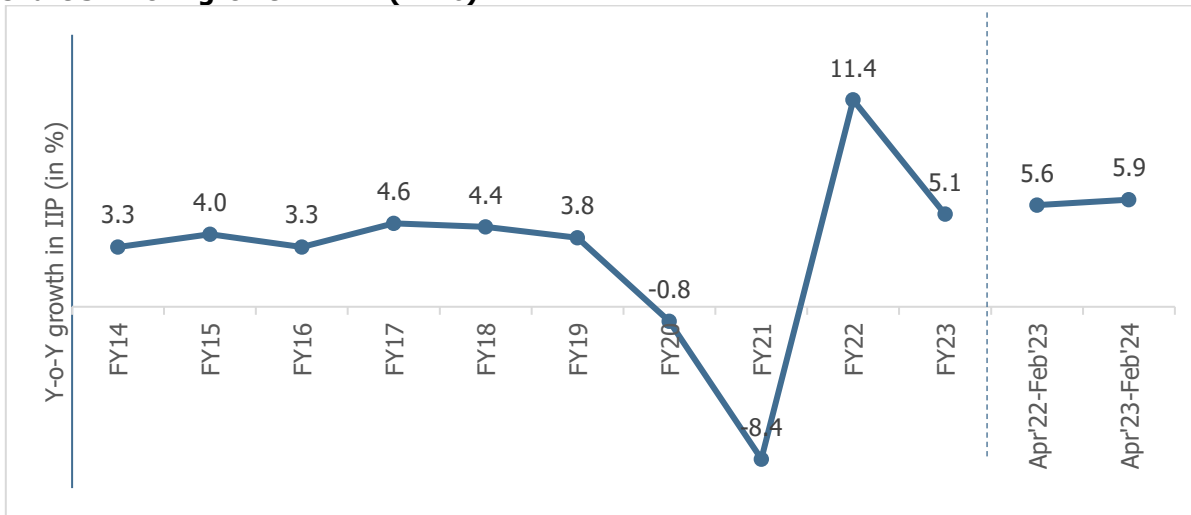
Improved Core and Capital Goods Sectors helped IIP Growth Momentum

The Index of Industrial Production (IIP) is an index to track manufacturing activity in an economy. On a cumulative basis, IIP grew by 11.4% y-o-y in FY22 post declining by 0.8% y-o-y and 8.4% y-o-y, respectively, in FY20 and FY21. This high growth was mainly backed by a low base of FY21. FY22 IIP was higher when compared with the pre-pandemic level of FY20, indicating that while economic recovery was underway.

During FY23, the industrial output recorded a growth of 5.1% y-o-y supported by a favorable base and a rebound in economic activities. The period April 2023 – February 2024, industrial output grew by 5.9% compared to the 5.6% growth in the corresponding period last year. For the month of February 2024, the IIP growth slowed down to 5.7% compared to the last year’s 6%, primarily on account of a normalization of base.

So far in the current fiscal, while the infrastructure-related sectors have been doing well, slowing global growth and unrest in the Middle-East have posed a challenge for industrial activity. Though the continued moderation in inflationary pressure offers some comfort, pain points in the form of elevated prices of select food items continue to persist.

Chart 3: Y-o-Y growth in IIP (in %)



Source: MOSPI

1.2.5 Consumer Price Index

India’s consumer price index (CPI), which tracks retail price inflation, stood at an average of 5.5% in FY22 which was within RBI’s targeted tolerance band of 6%. However, consumer inflation started to upswing from October 2021 onwards and reached a tolerance level of 6% in January 2022. Following this, CPI reached 6.9% in March 2022.

CPI remained elevated at an average of 6.7% in FY23, above the RBI’s tolerance level. However, there was some respite toward the end of the fiscal wherein the retail inflation stood at 5.7% in March 2023, tracing back to the RBI’s tolerance band. Apart from a favorable base effect, the relief in retail inflation came from a moderation in food inflation.

In FY24, the CPI moderated for two consecutive months to 4.7% in April 2023 and 4.3% in May 2023. This trend snapped in June 2023 with CPI rising to 4.9%. In July 2023, the CPI had reached its highest point at 7.4%, this was largely due to increase in food prices. The notable surge in vegetable prices and in other food categories such as cereals, pulses, spices, and milk have driven this increase. In August 2023, the food inflation witnessed some moderation owing to government’s active intervention. This was further moderated for second consecutive month in September 2023 to 5%, led by a sharp correction in vegetables prices and lower LPG prices. Helped by deflation in the fuel and light category, the retail inflation in October 2023 softened at 4.9%. This trend reversed in November 2023 due to spike in certain vegetable prices as well as sticky inflation in non-perishable food items such as cereals, pulses and spices and the CPI rose to 5.6%. In the month of December 2023, elevated food prices and an unfavourable base drove headline inflation to a four-month peak of 5.7%. However in the month of January and February, food prices softened and the inflation was reported at 5.1% for both the months. March witnessed further softening of prices registering 4.9% growth. For the full Financial year 2024 inflation moderated to 5.4% which are within the boundaries set of 2% to 6% by the RBI.

While the consistent decrease in core inflation due to falling commodity prices and diminishing demand-side pressures is encouraging, the ongoing high food inflation due to rising mercury levels could pose a significant risk worth monitoring. Despite these concerns, the favourable base effect throughout Q4FY24 and the expected easing of food price pressures and Government’s support could help mitigate inflation risks.

Chart 4: Retail Price Inflation in terms of index and Y-o-Y Growth in % (Base: 2011-12=100)

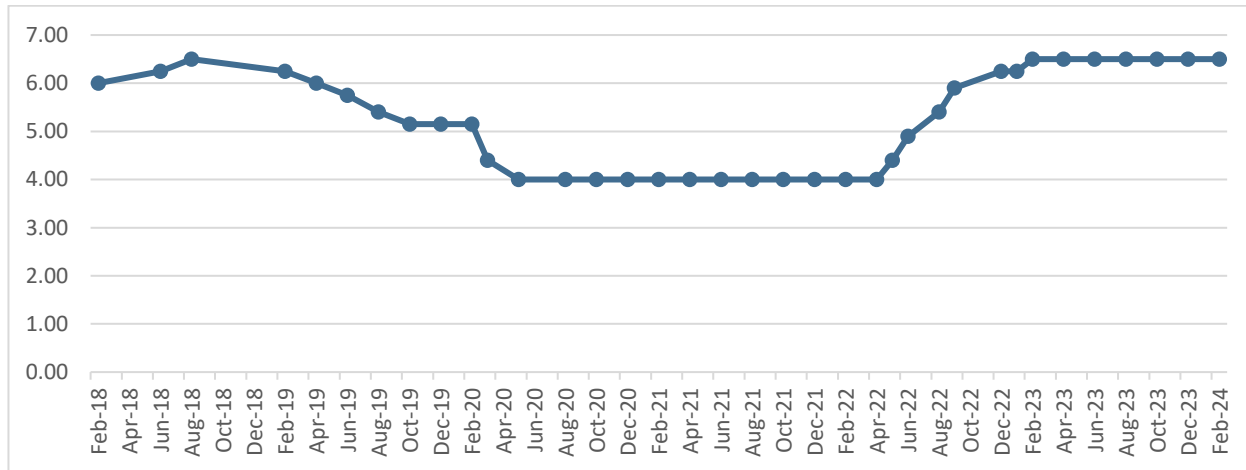


Source: MOSPI

The CPI is primarily factored in by RBI while preparing their bi-monthly monetary policy. At the bi-monthly meeting held in December 2023, RBI projected inflation at 5.4% for FY24 with inflation during Q3FY24 at 5.6%, Q4FY24 at 5.2%, while for FY25 it is pegged at 4.5% and in Q1FY25 at 5.0%, Q2FY25 at 4.0%, Q3FY25 at 4.6% and Q4FY25 at 4.7%.

The RBI has increased the repo rates with the rise in inflation in the past year from 4% in April 2022 to 6.5% in January 2023. Considering the current inflation situation, RBI has kept the repo rate unchanged at 6.5% in the last five meetings of the Monetary Policy Committee.

Chart 5: RBI historical Repo Rate



Source: RBI

In a meeting held in February 2024, RBI also maintained the liquidity adjustment facility (LAF) corridor by adjusting the standing deposit facility (SDF) rate of 6.25% as the floor and the marginal standing facility (MSF) at the upper end of the band at 6.75%.

Further, the central bank continued to remain focused on the withdrawal of its accommodative stance. With domestic economic activities gaining traction, RBI has shifted gears to prioritize controlling inflation. While RBI has paused on the policy rate front, it has also strongly reiterated its commitment to bringing down inflation close to its medium-term target of 4%. Given the uncertain global environment and lingering risks to inflation, the Central Bank has kept the window open for further monetary policy tightening in the future, if required.

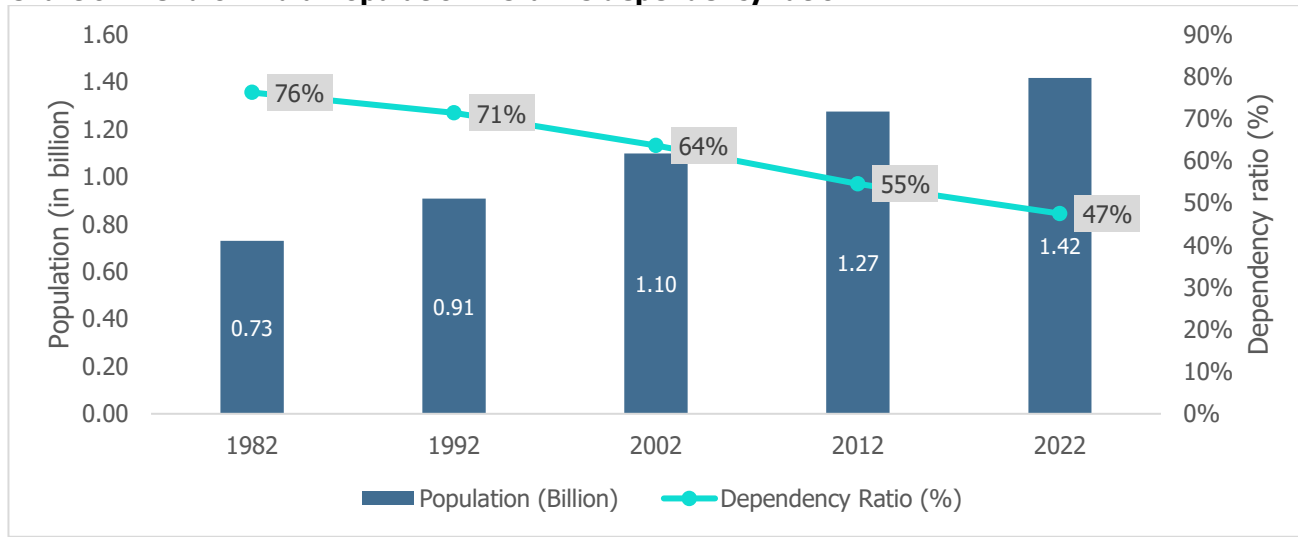
1.2.6 Overview on Key Demographic Parameters

- Population growth and Urbanization**

The trajectory of economic growth of India and private consumption is driven by socio-economic factors such as demographics and urbanization. According to the world bank, India’s population in 2022 surpassed 1.42 billion slightly higher than China’s population 1.41 billion and became the most populous country in the world.

Age Dependency Ratio is the ratio of dependents to the working age population, i.e., 15 to 64 years, wherein dependents are population younger than 15 and older than 64. This ratio has been on a declining trend. It was as high as 76% in 1982, which has reduced to 47% in 2022. Declining dependency means the country has an improving share of working-age population generating income, which is a good sign for the economy.

Chart 6: Trend of India Population vis-à-vis dependency ratio

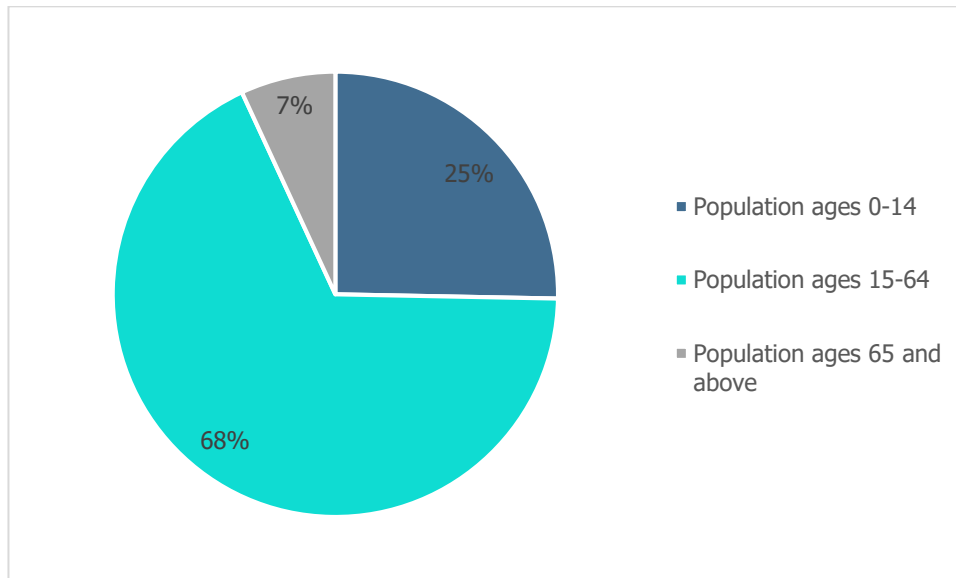


Source:

World Bank Database

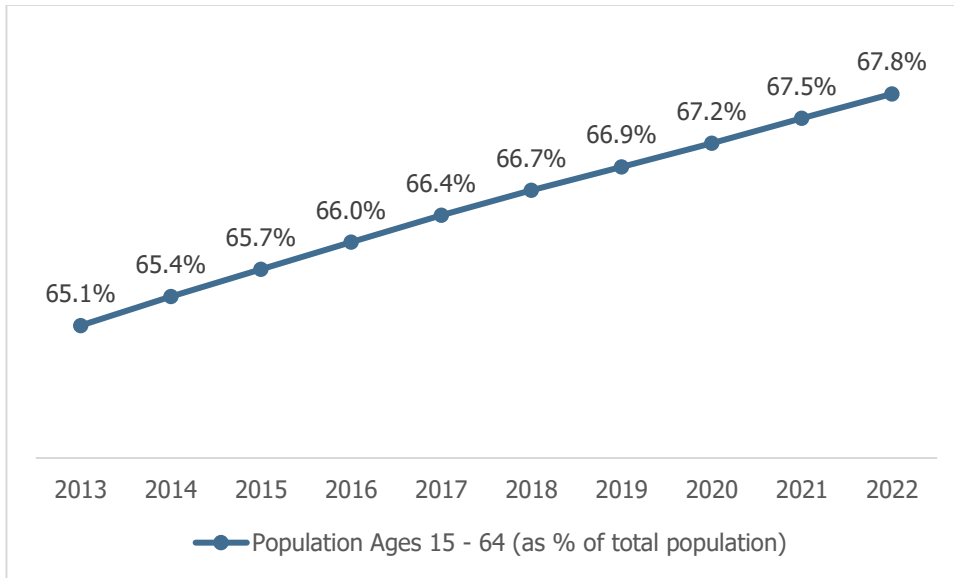
With an average age of 29, India has one of the youngest populations globally. With vast resources of young citizens entering the workforce every year, it is expected to create a 'demographic dividend'. India is home to a fifth of the world's youth demographic and this population advantage will play a critical role in economic growth.

Chart 7: Age-Wise Break Up of Indian population



Source: World Bank Database

Chart 8: Yearly Trend - Young Population as % of Total Population

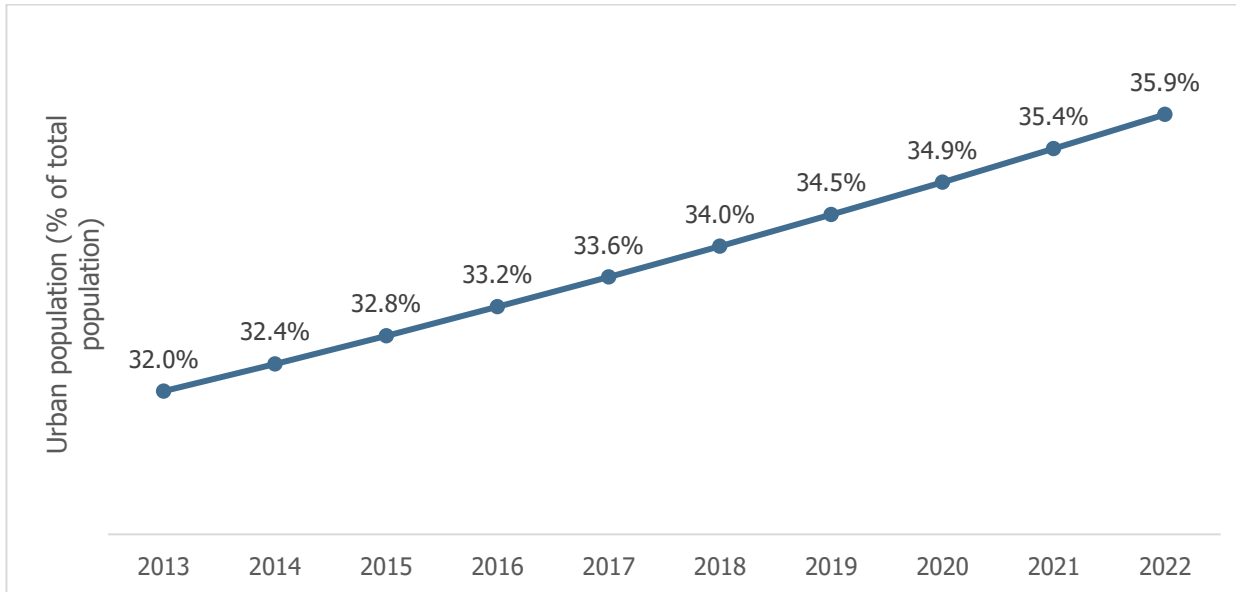


Source: World Bank database

- **Urbanization**

The urban population is significantly growing in India. The urban population in India is estimated to have increased from 403 million (31.6% of total population) in 2012 to 508 million (35.9% of total population) in the year 2022. People living in Tier-2 and Tier-3 cities have greater purchasing power.

Chart 9: Urbanization Trend in India



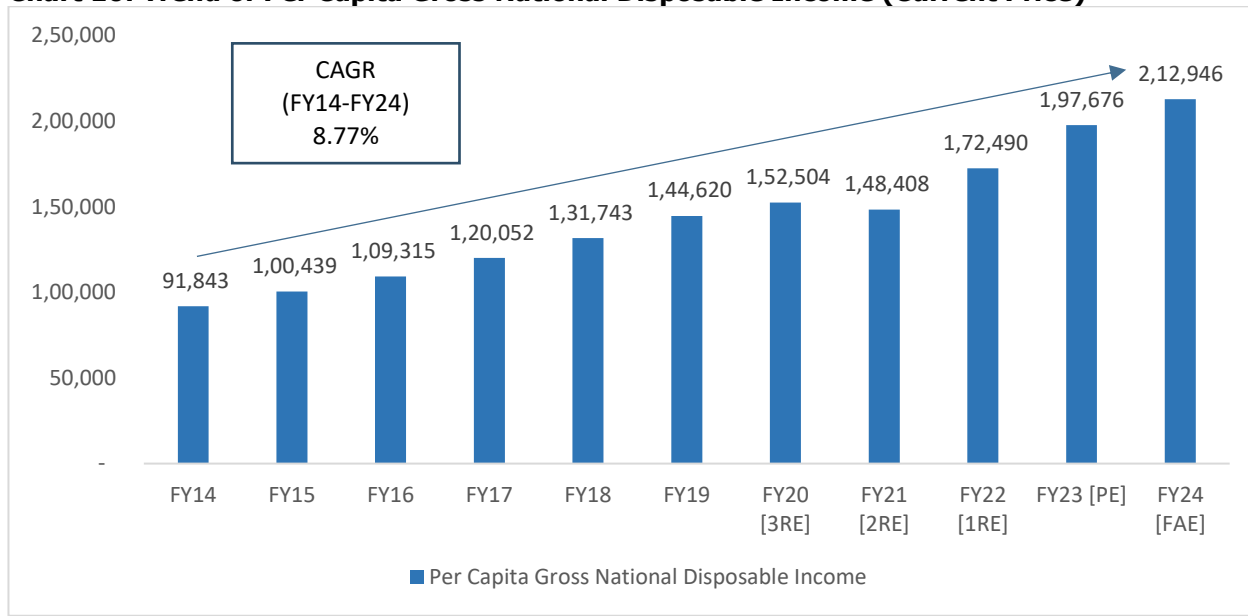
Source: World Bank Database

- **Increasing Per Capita Disposable Income**

Gross National Disposable Income (GNDI) is a measure of the income available to the nation for final consumption and gross savings. Between the period FY14 to FY24, per capita GNDI at current prices registered a CAGR of 8.77%. More disposable income drives more consumption, thereby driving economic growth.

The chart below depicts the trend of per capita GNDI in the past decade:

Chart 10: Trend of Per Capita Gross National Disposable Income (Current Price)

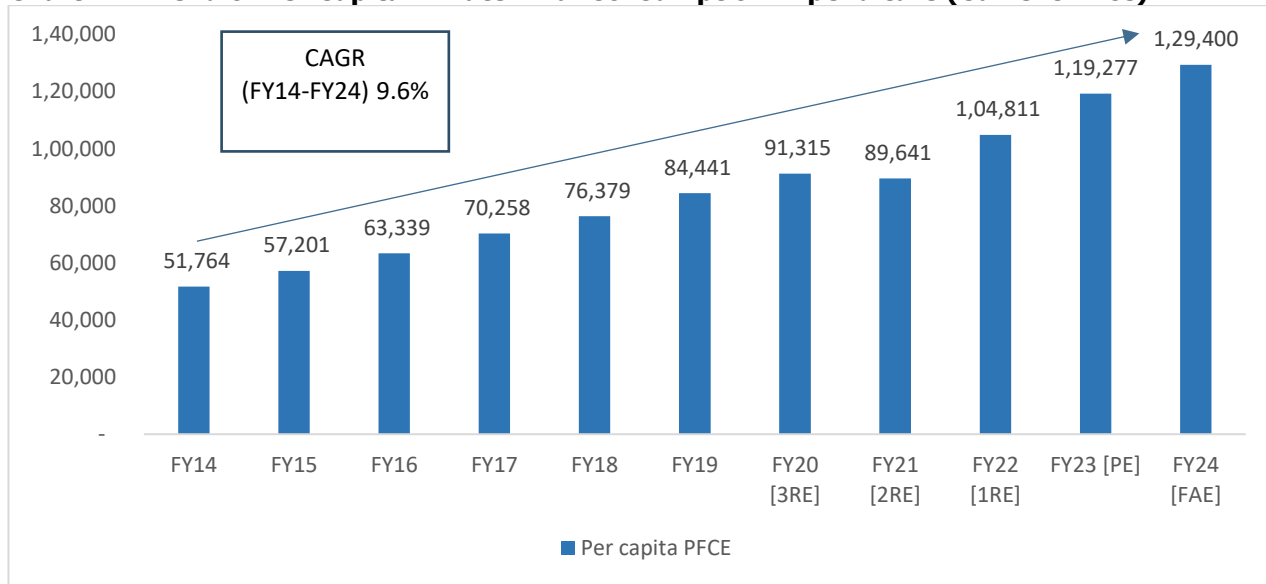


Note: 3RE – Third Revised Estimate, 2RE – Second Revised Estimates, 1RE – First Revised Estimates, PE – Provisional Estimate; Source: MOSPI

- Increase in Consumer Spending**

With increase in disposable income, there has been a gradual change in consumer spending behaviour as well. Private Final Consumption Expenditure (PFCE) which is measure of consumer spending has also showcased significant growth in the past decade at a CAGR of 9.6%. Following chart depicts the trend of per capita PFCE at current prices:

Chart 11: Trend of Per Capita Private Final Consumption Expenditure (Current Price)



1.2.7 Concluding Remarks

The major headwinds to global economic growth are escalating geopolitical tensions, volatile global commodity prices, and a shortage of key inputs. Despite the global economic growth uncertainties, the Indian economy is relatively better placed in terms of GDP growth compared to other emerging economies. According to IMF’s forecast, it is expected to be 6.8% in CY24 compared to the world GDP growth projection of 3.2%. The bright spots for the economy are continued healthy domestic demand, support from the government towards capital expenditure, moderating inflation, investments in technology and improving business confidence.

Likewise, several high-frequency growth indicators including the purchasing managers index, auto sales, bank credit, and GST collections have shown improvement in FY23. Moreover, normalizing the employment situation after the opening up of the economy is expected to improve and provide support to consumption expenditure.

The India Meteorological Department (IMD) has made a significant forecast, predicting "above normal" rainfall for the upcoming monsoon season, marking the first time in a decade that such an optimistic outlook has been declared at the initial stage. This forecast, coupled with an anticipated eight-year-high rainfall, offers promising prospects for the agrarian economy and inflation. The weakening of El Nino to a neutral stage in the early monsoon season, followed by the likely development of La Nina conditions in the later part, adds to the positive outlook. El Nino typically leads to suppressed rainfall during the Indian monsoon, whereas La Nina tends to enhance rainfall activity. IMD’s more optimistic prediction is expected to bolster agricultural growth and incomes, while also potentially alleviating stubborn food inflation pressures.

At the same time, public investment is expected to exhibit healthy growth as the government has allocated a strong capital expenditure of about Rs. 11.11 lakh crores for FY25. The private sector’s intent to invest is also showing improvement as per the data announced on new project investments. However, volatile commodity prices and economic uncertainties emanating from global turbulence may slow down the improvement in private CapEx and investment cycle.

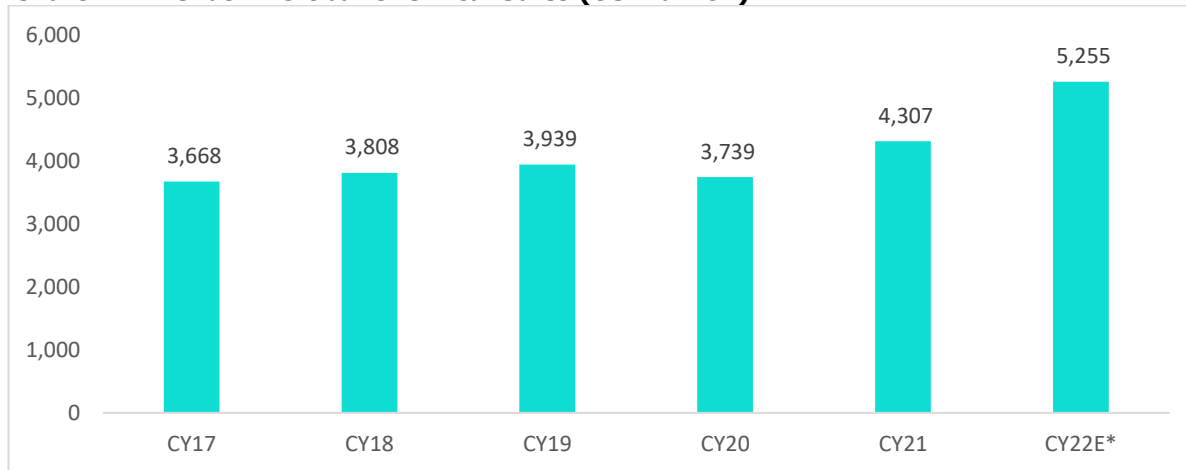
2. Overview of the Chemical Industry

2.1 Global Chemical Industry

The chemical industry is an integral element of the global economy and plays a critical role in nearly every facet of modern life serving numerous sectors such as agriculture, construction, automotive, FMCG, consumer durables, electronics, healthcare, etc. The global chemical industry is continually evolving through technological advancements, market dynamics, and sustainability initiatives.

Further, the importance of the chemical industry has resulted in the proliferation of chemicals across the globe with the industry sales estimated to grown from USD 3,668 billion in (Calendar Year) CY17 to estimated USD 5,255 billion in CY22.

Chart 12: Trends in Global Chemical Sales (USD billion)



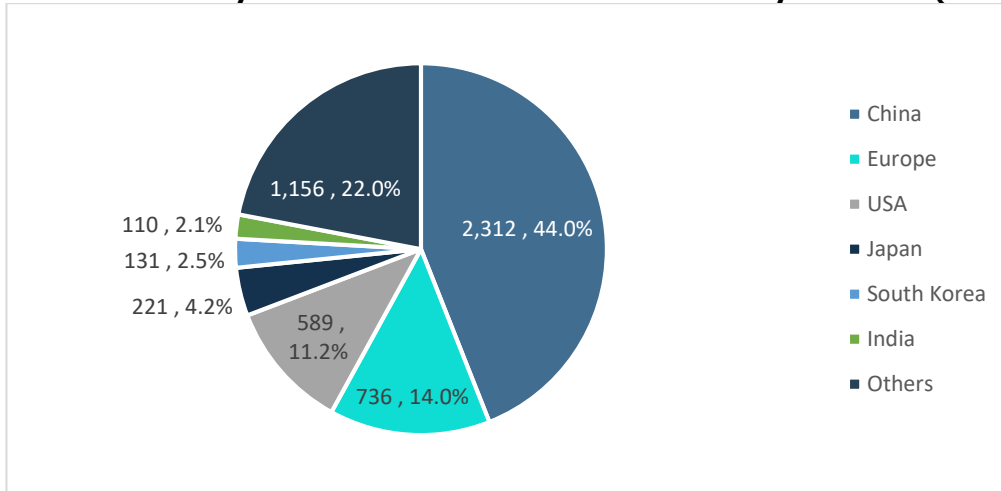
Source: European Chemical Industry Council (CEFIC)

Note: E: Estimated

With regard to expected chemical sales among the top 10 countries, China dominates with a lion’s share of 44%, trailed by Europe (27 nations), the USA, Japan, and South Korea with a share of 14% (USD 736 billion), 11.2% (USD 589 billion), 4.2% (USD 221 billion), and 2.5% (USD 131 billion), respectively, in 2022E sales.

Further, India’s expected rank is sixth in terms of global chemical sales with a contribution of USD 111 billion and will approximately account for a share of 2.1% during 2022. The other nations that formed part of the top 10 countries in expected global chemical sales were Taiwan, Brazil and Russia with a share of 1.9%, 2.6% and 1.7%.

Chart 13: Country-Wise International Chemical Sales for year 2022E (USD billion)



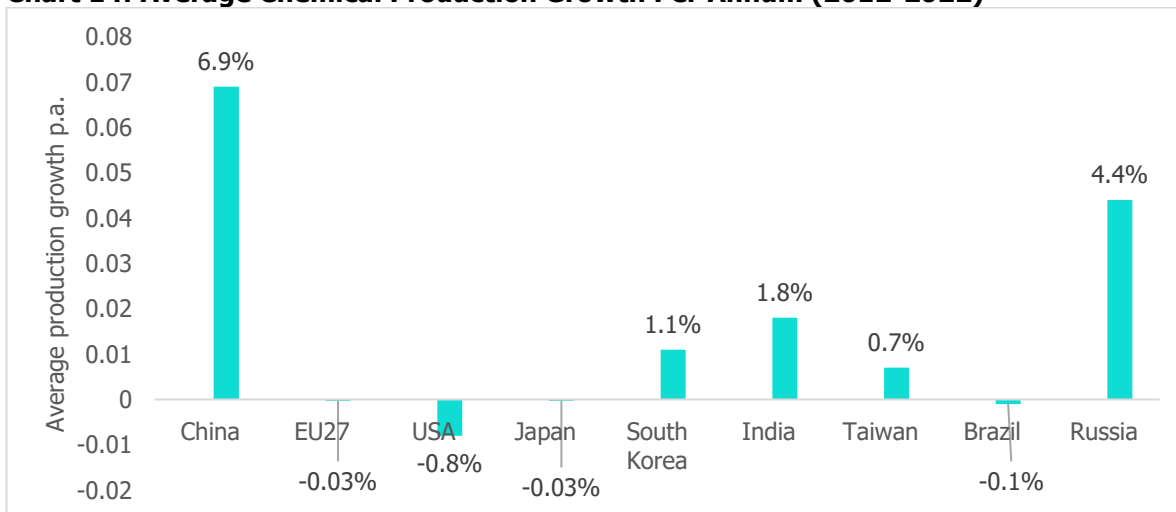
Source: CEFIC

Note: Figures in brackets represent the percentage share

The significant share of China in world chemical sales is supplemented by its average chemicals production growth rate per annum. China’s average chemical production is expected to increase by 6.9% over the ten-year period, 2012-2022, the fastest among the countries.

India's average chemical production growth rate is expected to be 3.8% for the ten-year duration which is low compared to the output rates of Saudi Arabia, China, and Russia. However, the country's average chemical production is expected to grow faster compared to that of South Korea (2.8%), Europe (EU) (27 nations) (1.6%), Brazil (0.6%), Japan (1.0%), and the USA (0.5%) during the ten-year period, 2012-2022. This chart also highlights that emerging countries outpaced industrial economies in chemical production as per CEFIC.

Chart 14: Average Chemical Production Growth Per Annum (2012-2022)



Source: CEFIC

2.2 Indian Chemical Industry

The size of the Indian chemicals industry, excluding pharmaceuticals, in terms of the value of output in the year FY22 was around Rs. 9.10 lakh crores and 8.4% of the value of the output of the manufacturing sector at constant prices as against 7.9% in FY18. The chemical and chemical products except pharmaceuticals has registered a CAGR of 8.8% from FY18 to FY22

Furthermore, as per the Government of India’s Department of Chemicals and Petrochemicals, India ranks 11th in the world exports of chemicals (excluding pharmaceutical products) and 6th in the world imports of chemicals (excluding pharmaceutical products).

Similarly, India’s imports of chemicals (excluding pharmaceutical products) reached Rs. 8.5 lakh crore indicating a 66.01% growth y-o-y in FY22, while the exports reached Rs. 4.9 lakh crore indicating a 30.12% growth y-o-y in FY22.

Major chemicals in India are broadly divided into 5 segments as mentioned below:

- 1. Alkali Chemicals:** This segment comprises products like soda ash, caustic soda, and liquid chlorine.
- 2. Inorganic Chemicals:** This segment comprises products like carbon black, calcium carbonate, and hydrogen peroxide, among others.
- 3. Organic Chemicals:** This segment comprises products like ethyl acetate, chloro methanes, and formaldehyde, among others.
- 4. Pesticides and Insecticides:** This segment comprises products like mancozab, 2, 4-D, acephate, and profenofos technical.
- 5. Dyes and Pigments:** This segment comprises products like reactive dyes, organic pigment, and dispersed dyes.

Share-wise details of each of the 5 segments in aggregate major chemicals production during H1FY23 are mentioned in the table below.

Table 4: Segment-Wise Production Volume and Percentage Share of Major Chemicals during H1FY23

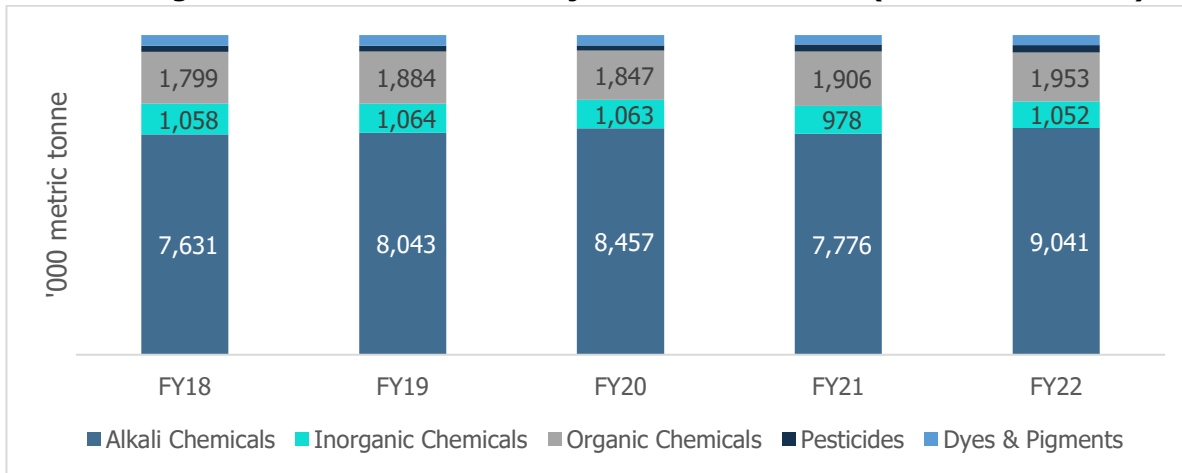
| Segment | Production volume of each segment in total major chemicals production during H1FY23 ('000 metric tonnes) | Production volume of each segment in total major chemicals production during FY22 ('000 metric tonnes) | % share of each segment in total major chemicals production during FY22 |
|---------------------|--|--|---|
| Alkali chemicals | 4,745 | 9,041 | 70.95 |
| Inorganic chemicals | 529 | 1,052 | 8.26 |
| Organic chemicals | 904 | 1,953 | 15.33 |
| Pesticides | 138 | 299 | 2.35 |
| Dyes & pigments | 171 | 398 | 3.12 |

| | | | |
|------------------|--------------|---------------|------------|
| Aggregate | 6,487 | 12,743 | 100 |
|------------------|--------------|---------------|------------|

Source: Department of Chemicals and Petrochemicals, Government of India (GoI)

The production of major chemicals in India on an aggregate basis grew at a CAGR of 4.61% from 11,069 thousand metric tonnes in FY18 to 12,743 thousand metric tonnes in FY22. The rise in output is primarily supplemented by a 4.3% CAGR in the production of alkali chemicals (the largest segment accounting for about 71% of the total major chemical output in 2021-22) as mentioned in the table above.

Chart 15: Segment-Wise Production of Major Chemicals in India ('000 metric tonnes)



Source: Department of Chemicals and Petrochemicals, GoI

3 Global Citrate Industry

3.1 Overview

The versatility of citrate and its products makes it a key compound used in a variety of industrial applications. Natural citric acid exists in plants such as lemons, citrus, pineapples, and other fruits, and in animals' bones, muscles, and blood. Citrates include sodium citrate, potassium citrate, calcium citrate, zinc citrate, etc.

Table 5: Types of Citrates

| Types | Description |
|--------------------------|---|
| Sodium Citrate | Sodium Citrate is the sodium salt of citric acid. Like citric acid, it has a sour taste. Similarly, it has a salty taste like other salts. It is commonly known as sour salt and is mainly used as a food additive, usually for flavour or as a preservative. It gives club soda both its sour and salty flavours. |
| Potassium Citrate | Potassium Citrate is used in foods, beverages, and technical applications as a buffering, sequestering or emulsifying agent. It is used as an alternative to sodium citrate whenever a low sodium content is required. Whereas in pharmaceuticals, it is used as a potassium source and as an active ingredient for treatment of urinary duct stones. |
| Calcium Citrate | Calcium Citrate is an organic calcium salt composed of calcium cations and citrate anions in a 3:2 ratio. It is used as a nutraceutical, a food additive, a food preservative, and a flavouring agent. |
| Zinc citrate | Zinc Citrate is mainly used in dental care products such as toothpaste, mouthwashes, and chewing gums. It is also used in pharmaceuticals, food supplements, and functional foods & beverages. It is available as a dietary supplement for the treatment of zinc deficiency and source of zinc. |
| Others | Other citrates include magnesium citrate, magnesium citrate, ferric ammonium citrate, etc. |

Source: CAREEDGE Research

Table 6: Application of Citrates

| Applications Description | Applications Description |
|--------------------------|---|
| Food and Beverage | Citrate's primary role in the food and beverage industry is as a flavouring agent to improve mouthfeel alongside as a pH control agent. For example, it is used for gel control, buffering, and enhancing preservatives and as a chelating agent to enhance the effect of antioxidants and prevent seafood from getting spoiled. It also improves flavour and ensures the accuracy of the acidity in drinks. |
| Medicine | Citrate works by reducing the amount of acid in the body. Therefore, they prevent and treat high acid levels in the body. It may also be used to help prevent gout or kidney stones (conditions caused by high uric acid levels). Whereas it regulates pH and acts as an effective buffering system. Furthermore, it can be employed in effervescent tablets and preparations to enhance the palatability of drugs. |
| Chemical | As a chemical, citrate has a wide range of industrial uses, such as detergents, cosmetic additives, industrial retarders, adhesives, sealants, etc. |

| Applications Description | Applications Description |
|--------------------------|--|
| Reagents | Citrates are essential in reagents, facilitating precise metal ion concentration determination through complexometric titrations. They also serve as pH buffers in biochemical and molecular biology experiments, supporting enzymatic reactions and maintaining optimal pH levels. |
| Nutraceuticals | Citrates, such as calcium citrate and magnesium citrate, play a vital role in nutraceuticals as highly bioavailable mineral supplements. These compounds are readily absorbed by the body, making them effective in products like calcium and magnesium supplements, which promote bone health, muscle function, and overall well-being. The bioavailability of citrate forms enhances their appeal in the nutraceutical industry. |
| Veterinary | Citrates may be used in veterinary pharmaceuticals for various purposes, such as formulation excipients, stabilizers, or buffering agents in medications for animals. |
| Biotechnology | In biotechnology, citrates are often used as buffers to control the pH of biological solutions. They can also serve as chelating agents in certain processes involving enzymes or proteins. |
| Metallurgy | Citrates can function as complexing agents in metallurgical processes. Their chelating properties make them useful in metal ion sequestration, preventing unwanted precipitation and facilitating metal ion control in various applications. |
| Electronics | Citrates may be employed in the electronics industry for specific applications, such as in the preparation of electrolytes for batteries or as additives in electroplating processes. |
| Personal Care | Citrates have applications in personal care products. They can be used as chelating agents, stabilizers, or pH adjusters in cosmetics, skincare, and hair care formulations. Citric acid itself is commonly used in various personal care products. |

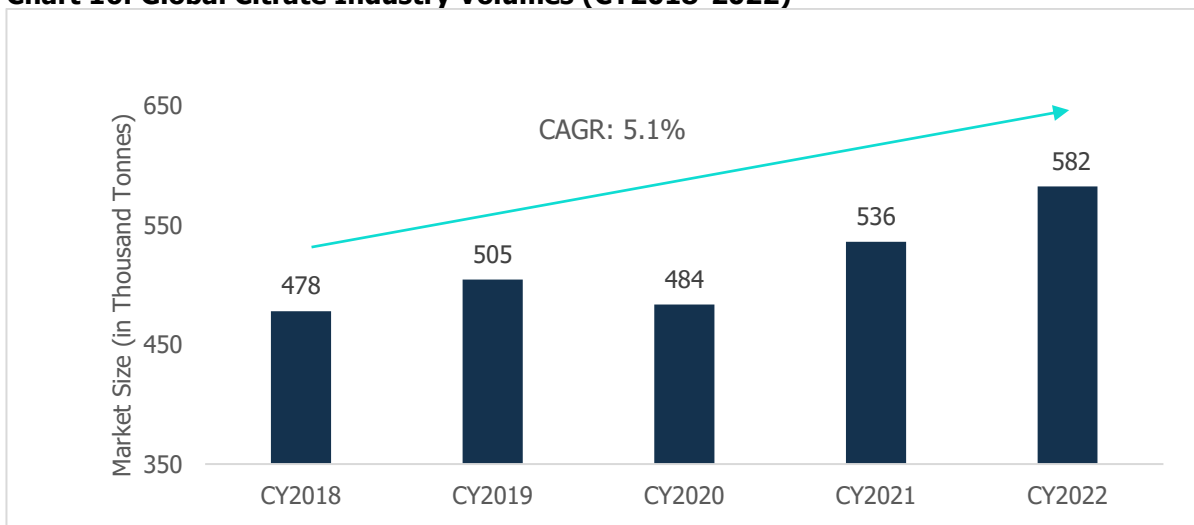
Source: CAREEDGE Research

3.2 Global Citrate Industry – Market Size

3.2.1 Volume

The global citrate industry’s consumption volumes grew at a Compounded Annual Growth Rate (CAGR) of 5.1% from 478 thousand tonnes in CY2018 to 582 thousand tonnes in CY2022.

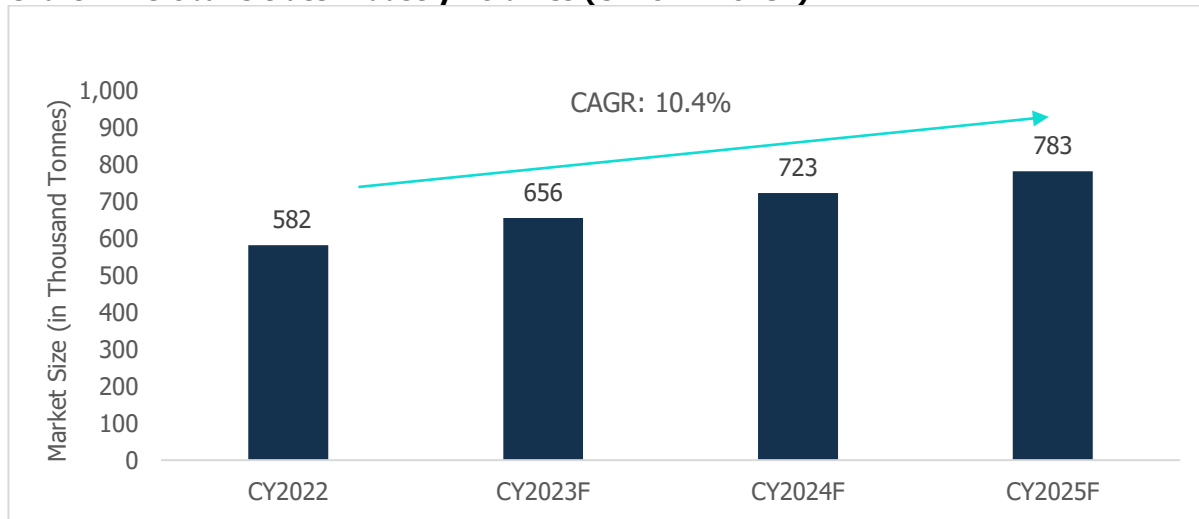
Chart 16: Global Citrate Industry Volumes (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The consumption volumes are expected to grow from 582 thousand tonnes in CY2022 to 783 thousand tonnes in CY2025, at a CAGR of 10.4%.

Chart 17: Global Citrate Industry Volumes (CY2022-2025F)

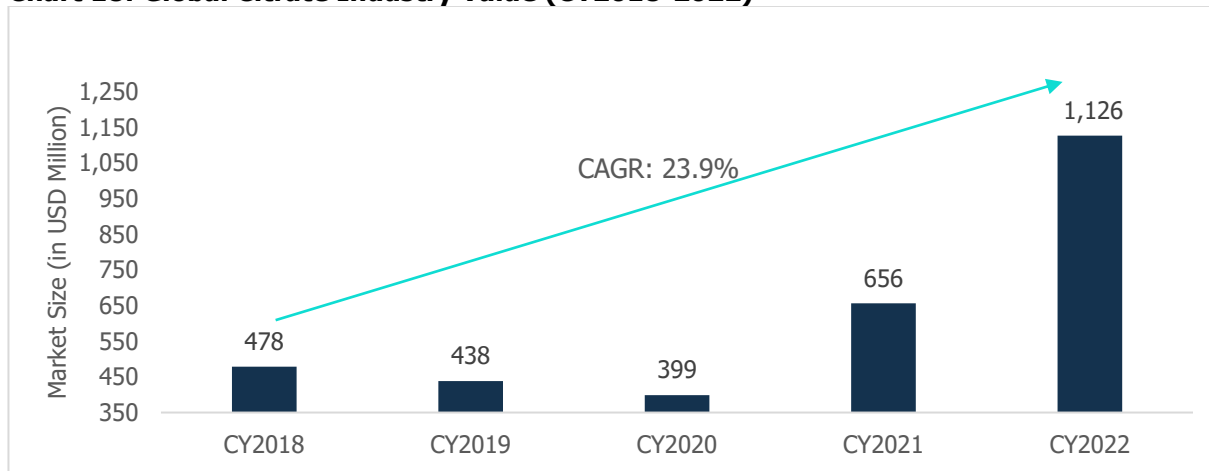


Source: Maia Research, CAREEDGE Research
Note: F: Forecast

3.2.2 Value

The global citrate consumption grew substantially in value, at a CAGR of 23.9% from USD 478 million in CY2018 to USD 1,126 million in CY2022. This growth was driven by increased consumption volumes and a sharp uptick in citrate prices which surged by nearly 95% between CY2018 and CY2022.

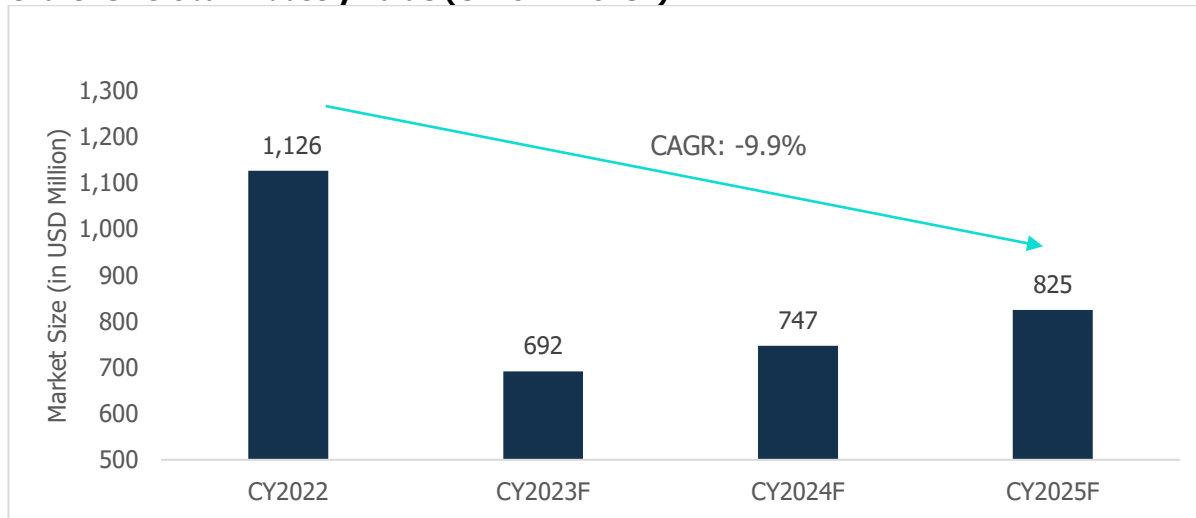
Chart 18: Global Citrate Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The global citrate industry size is expected to decline from USD 1,126 million in CY2022 to USD 825 million in CY2025. While the industry is expected to witness 10.4% volume growth over this period, the prices are expected to decline due to normalization following a sharp increase in CY2022, leading to a decline in market size in value terms.

Chart 19: Global Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F: Forecast

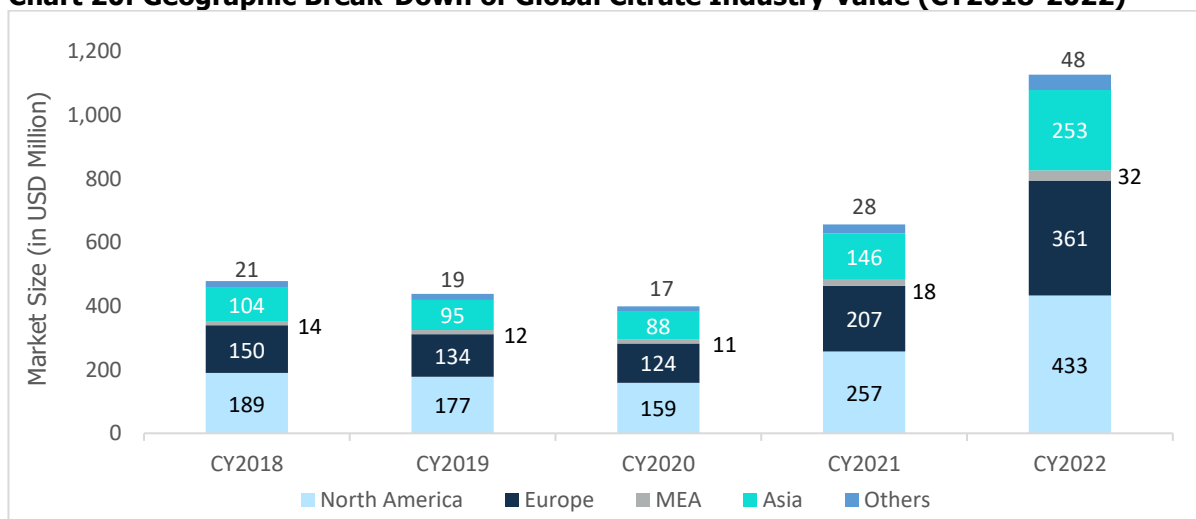
3.3 Break-Up of Global Citrate Industry Value by Geography

The North American region is the largest market of citrates, accounting for over 39% of the global market share in CY2022. The region registered a CAGR of 23% from CY2018 to CY2022.

Whereas the European region is the second-largest market for citrates, representing 32% of the global market share in CY2022. The region has achieved a CAGR of 24.5% from CY2018 to CY2022.

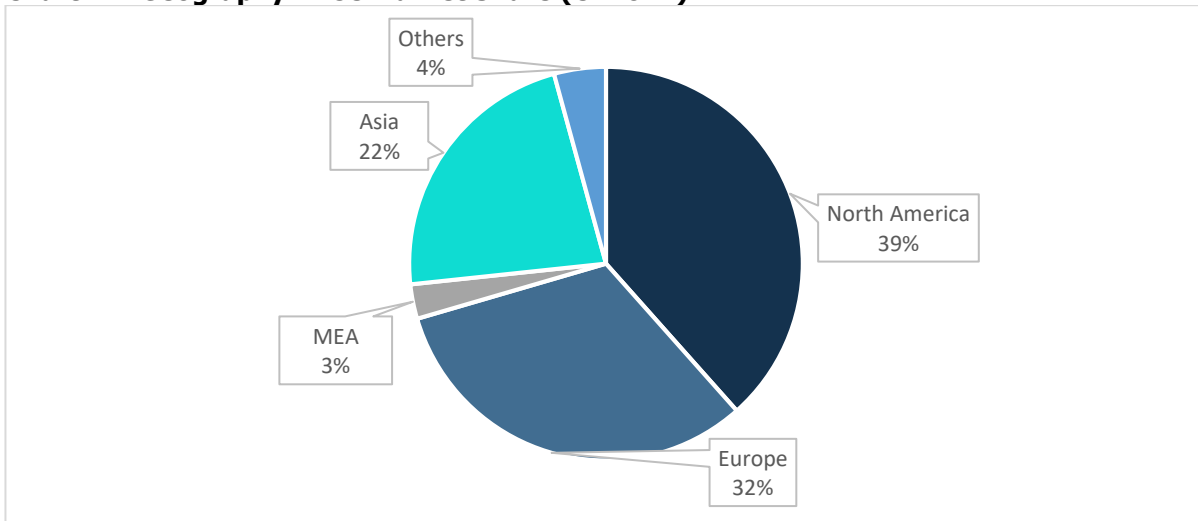
Further, in CY2022, Asia stands as the world's third-largest market for citrates, commanding approximately 22% of the global market share. Notably, this region has registered a CAGR of 24.7% from CY2018 to CY2022.

Chart 20: Geographic Break-Down of Global Citrate Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

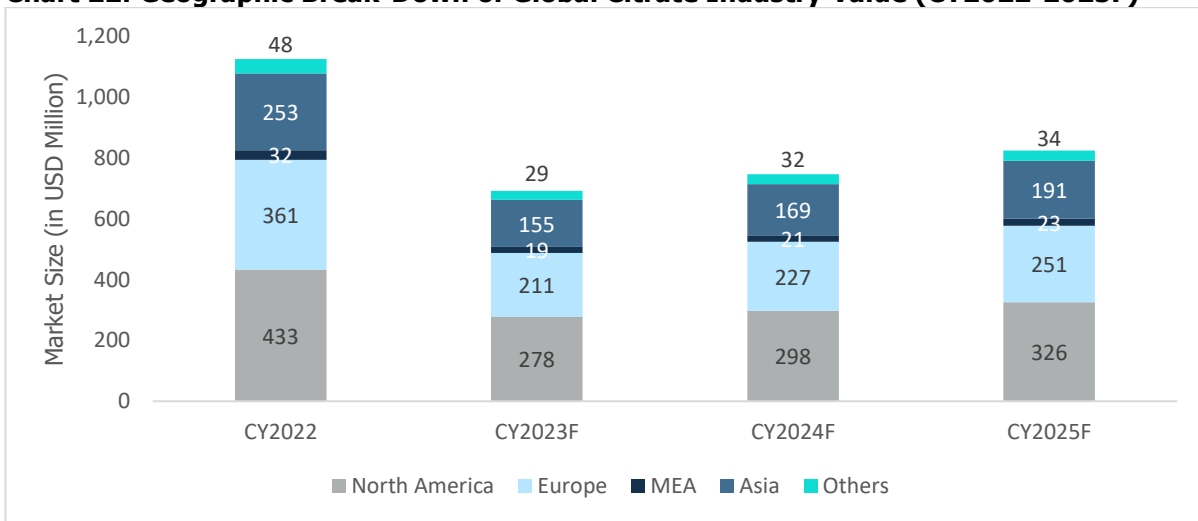
Chart 21: Geography-Wise Market Share (CY2022)



Source: Maia Research, CAREEDGE Research

North America is expected to remain the largest market for citrates with an expected share of 40% in CY2025.

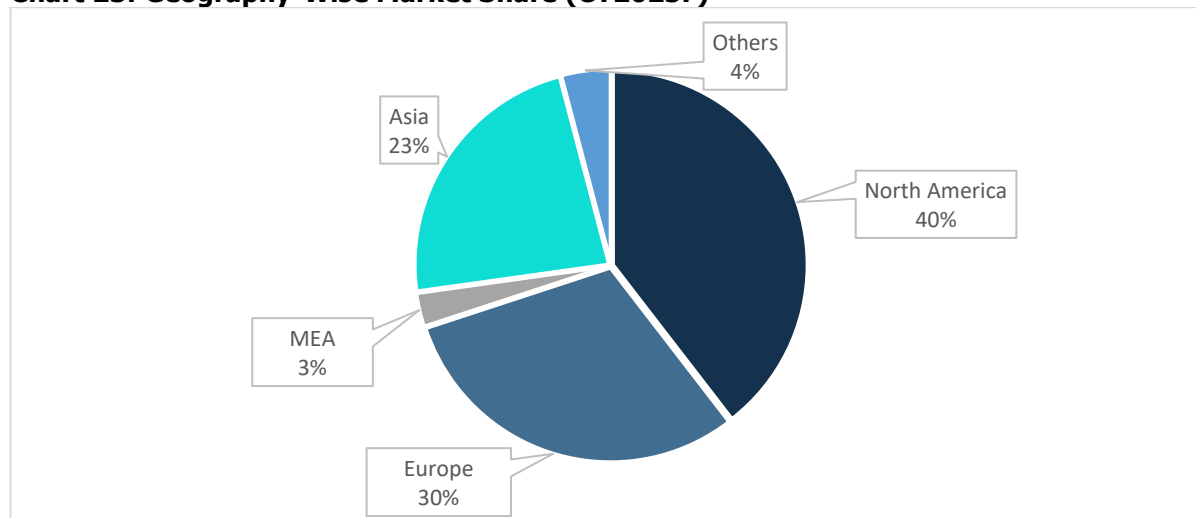
Chart 22: Geographic Break-Down of Global Citrate Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F: Forecast

Chart 23: Geography-Wise Market Share (CY2025F)



Source: Maia Research, CAREEDGE Research

3.4 Break-Up of Global Citrate Industry by Grade

The various grades of Citrates are as below:

Table 7: Citrate Grades

| Types | Description |
|----------------------------|--|
| Pharma Grade | Pharma grade citrates are the highest quality citrates available and are used in the production of pharmaceuticals. They must meet strict standards set by regulatory bodies such as the United States Food and Drug Administration (FDA) and the European Medicines Agency (EMA). |
| Reagent Grade | Reagent grade citrates are used in analytical laboratories and other research settings. They must meet high standards of purity and consistency. |
| Nutraceutical Grade | Nutraceutical grade citrates are used in the production of dietary supplements and functional foods and beverages. They must meet the standards set by the Food Chemicals Codex (FCC), which is a compendium of standards for food-grade ingredients. |
| Others | Other grades include Feed grade and Industrial grade. |

Source: CAREEDGE Research

The pharma grade citrates have demonstrated a CAGR of 4.4%, reagent grade 7.4% and nutraceutical grade 5.1% in volume terms, over CY2018-2022. The pharma grade citrates are expected to demonstrate a CAGR of 9.8%, reagent grade 11.2% and nutraceutical grade 10.6% in volume terms, over CY2022-2025.

Table 8: Break-up of Global Citrate Industry Volume by Grade (In Thousand Tonnes)

| Grades | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023F | CY2024F | CY2025F | CAGR | |
|----------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|--------------|
| | | | | | | | | | CY2018-22 | CY2022-25 |
| Pharma Grade | 71.9 | 75.6 | 71.6 | 79.0 | 85.4 | 95.7 | 105.0 | 113.0 | 4.4% | 9.8% |
| IP | 10.2 | 10.7 | 10.2 | 11.2 | 12.2 | 13.6 | 14.9 | 16.0 | 4.4% | 9.6% |
| BP | 19.2 | 20.2 | 19.2 | 21.2 | 23.0 | 25.9 | 28.5 | 30.7 | 4.7% | 10.1% |
| EP | 11.9 | 12.4 | 11.7 | 12.9 | 13.9 | 15.5 | 16.9 | 18.1 | 3.9% | 9.3% |
| USP | 22.2 | 23.3 | 22.0 | 24.2 | 26.0 | 29.1 | 31.8 | 34.2 | 4.0% | 9.5% |
| JP | 8.4 | 8.9 | 8.5 | 9.5 | 10.3 | 11.7 | 12.9 | 14.0 | 5.3% | 10.7% |
| Reagent Grade | 34.3 | 35.8 | 37.3 | 41.6 | 45.5 | 51.7 | 57.4 | 62.6 | 7.4% | 11.2% |
| R | 16.7 | 17.4 | 18.1 | 20.2 | 22.1 | 25.0 | 27.8 | 30.3 | 7.3% | 11.1% |
| AR | 7.4 | 7.7 | 8.0 | 9.0 | 9.8 | 11.1 | 12.3 | 13.5 | 7.4% | 11.3% |
| GR | 6.3 | 6.6 | 6.9 | 7.7 | 8.5 | 9.6 | 10.7 | 11.7 | 7.7% | 11.4% |
| ACS | 4.0 | 4.1 | 4.3 | 4.8 | 5.2 | 5.9 | 6.5 | 7.1 | 7.0% | 10.8% |
| Nutraceutical Grade (FCC) | 266.2 | 281.4 | 268.5 | 298.4 | 325.0 | 367.0 | 405.7 | 440.1 | 5.1% | 10.6% |
| Others | 105.7 | 111.9 | 106.3 | 117.2 | 126.5 | 141.7 | 155.3 | 167.1 | 4.6% | 9.7% |
| Total | 478.1 | 504.6 | 483.7 | 536.2 | 582.4 | 656.0 | 723.4 | 782.7 | 5.1% | 10.4% |

Source: Maia Research, CAREEDGE Research

Note: F: Forecast

The pharma grade citrates have demonstrated a CAGR of 23.1%, reagent grade 26.6%, and nutraceutical grade 24.0% in value terms, over CY2018-2022. The market for all these grades is expected to see a decline in value terms over CY2022-25 on account of pricing correction.

Table 9: Break-up of Global Citrate Industry Value by Grade (In USD Million)

| Grades | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023F | CY2024F | CY2025F | CAGR | |
|----------------------------------|--------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|--------------|---------------|
| | | | | | | | | | CY2018-22 | CY2022-25 |
| Pharma Grade | 78.3 | 71.4 | 64.3 | 105.2 | 179.8 | 109.9 | 118.0 | 129.7 | 23.1% | -10.3% |
| IP | 10.3 | 9.3 | 8.5 | 13.8 | 23.6 | 14.4 | 15.5 | 17.0 | 23.1% | -10.4% |
| BP | 21.2 | 19.4 | 17.5 | 28.7 | 49.3 | 30.2 | 32.5 | 35.8 | 23.5% | -10.1% |
| EP | 13.1 | 11.9 | 10.6 | 17.3 | 29.4 | 17.9 | 19.2 | 21.0 | 22.6% | -10.7% |
| USP | 24.6 | 22.4 | 20.1 | 32.8 | 55.8 | 34.0 | 36.4 | 39.9 | 22.7% | -10.6% |
| JP | 9.1 | 8.4 | 7.6 | 12.6 | 21.7 | 13.4 | 14.5 | 16.1 | 24.2% | -9.6% |
| Reagent Grade | 36.6 | 33.2 | 32.8 | 54.4 | 94.1 | 58.2 | 63.3 | 70.4 | 26.6% | -9.2% |
| R | 16.8 | 15.2 | 15.0 | 24.8 | 43.0 | 26.6 | 28.9 | 32.1 | 26.6% | -9.3% |
| AR | 7.7 | 7.0 | 6.9 | 11.5 | 19.9 | 12.3 | 13.4 | 14.9 | 26.7% | -9.1% |
| GR | 7.1 | 6.5 | 6.4 | 10.7 | 18.5 | 11.5 | 12.5 | 14.0 | 27.0% | -9.0% |
| ACS | 5.0 | 4.5 | 4.5 | 7.4 | 12.7 | 7.8 | 8.5 | 9.4 | 26.2% | -9.5% |
| Nutraceutical Grade (FCC) | 265.6 | 243.6 | 220.9 | 364.1 | 626.9 | 386.0 | 417.8 | 462.6 | 24.0% | -9.6% |
| Others | 97.7 | 89.8 | 80.9 | 132.2 | 225.6 | 137.7 | 147.7 | 162.1 | 23.3% | -10.4% |
| Total | 478.1 | 437.9 | 398.9 | 655.8 | 1126.4 | 691.8 | 746.8 | 824.8 | 23.9% | -9.9% |

Source: Maia Research, CAREEDGE Research

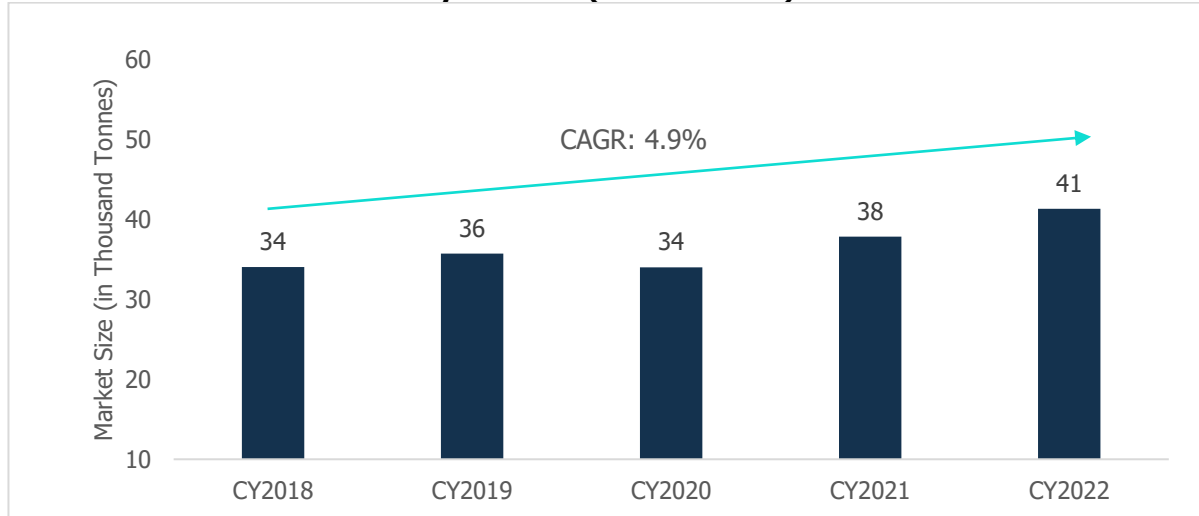
Note: F: Forecast

3.5 Indian Citrate Industry

3.5.1 Volume

The Indian citrate industry consumption volumes have recorded a CAGR of 4.9% from 34 thousand tonnes in CY2018 to 41 thousand tonnes in CY2022.

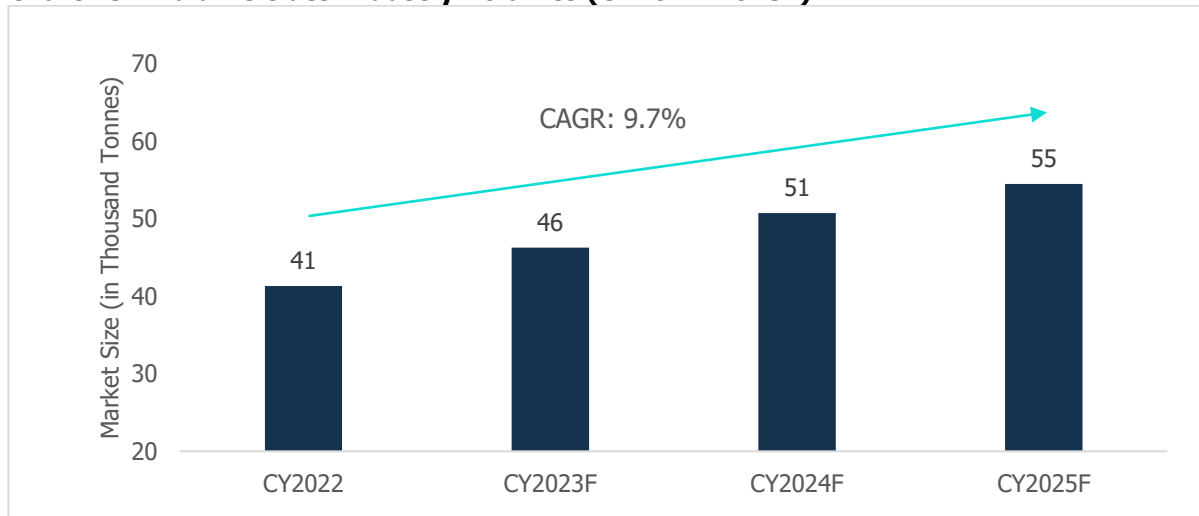
Chart 24: Indian Citrate Industry Volumes (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The industry volumes are expected to grow from 41 thousand tonnes in CY2022 to 55 thousand tonnes in CY2025, implying a CAGR of 9.7%.

Chart 25: Indian Citrate Industry Volumes (CY2022-2025F)



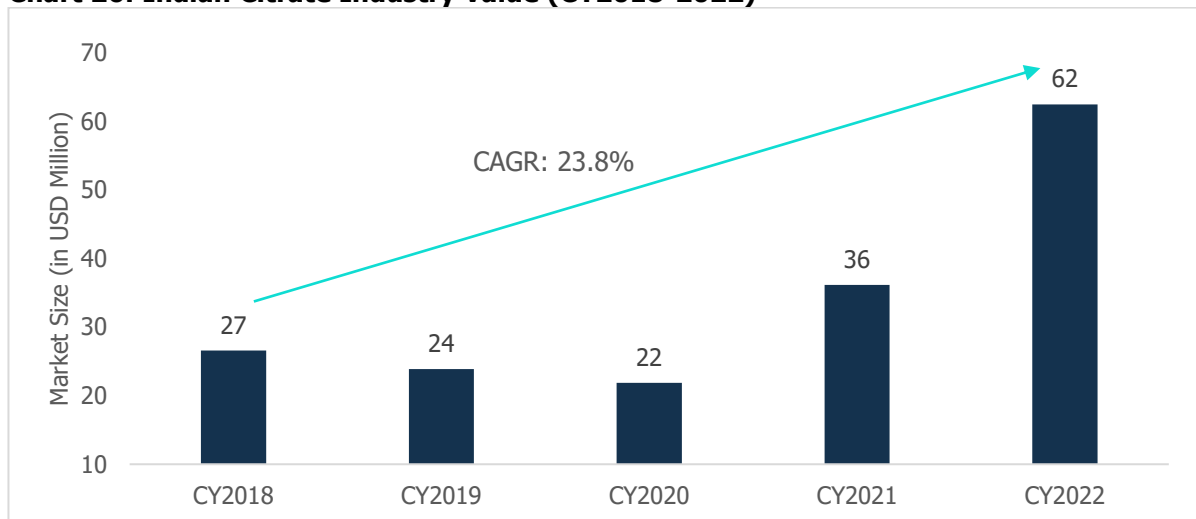
Source: Maia Research, CAREEDGE Research

Note: F: Forecast

3.5.2 Value

The Indian citrate industry has grown at a CAGR of 23.8% over past five years from USD 27 million in CY2018 to USD 62 million in CY2022.

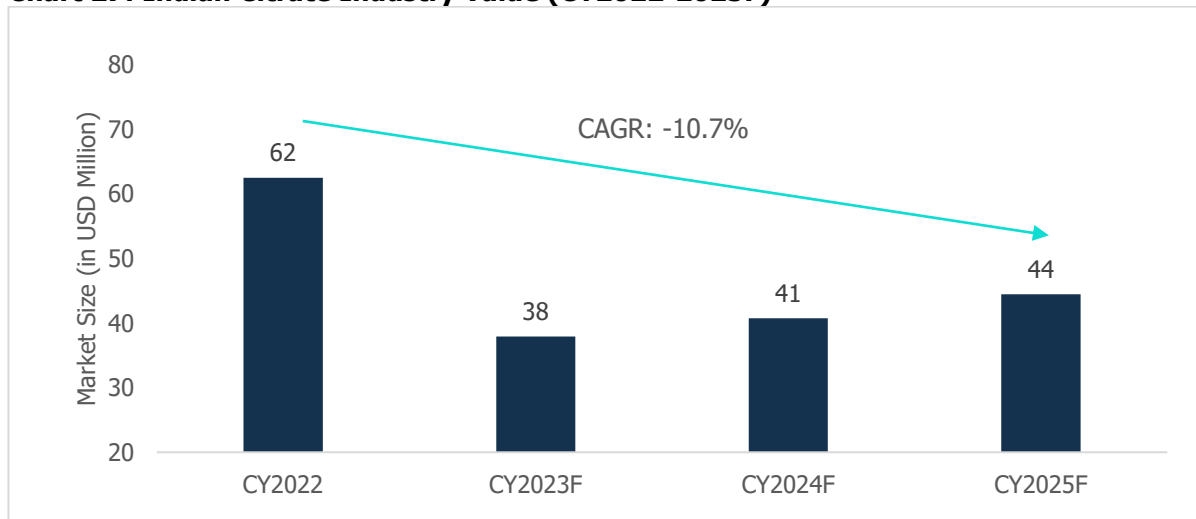
Chart 26: Indian Citrate Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The Indian citrate industry is expected to experience a revenue decline from USD 62 million in CY2022 to USD 44 million in CY2025, at a negative CAGR of approximately 10.7%, despite a volume growth of 9.7% over the same period, on account of price correction.

Chart 27: Indian Citrate Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F: Forecast

3.5.3 Break-Up of Indian Citrate Industry by Grade

The pharma grade citrates have demonstrated a CAGR of 4.3%, reagent grade 4.6%, and nutraceutical grade 5.0% in volume terms, over CY2018-2022. The pharma grade citrates are expected to demonstrate a CAGR of 9.2%, reagent grade 10.5% and nutraceutical grade 10.0% in volume terms, over CY2022-2025.

Table 10: Break-up of the Indian Citrate Industry Volume by Grade (In Thousand Tonnes)

| Grades | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023F | CY2024F | CY2025F | CAGR | |
|----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| | | | | | | | | | CY2018-22 | CY2022-25F |
| Pharma Grade | 3.7 | 3.9 | 3.7 | 4.1 | 4.4 | 4.9 | 5.4 | 5.8 | 4.3% | 9.2% |
| IP | 0.7 | 0.7 | 0.6 | 0.7 | 0.8 | 0.9 | 0.9 | 1.0 | 4.0% | 9.2% |
| BP | 1.0 | 1.0 | 0.9 | 1.1 | 1.1 | 1.3 | 1.4 | 1.5 | 4.7% | 9.3% |
| EP | 0.5 | 0.6 | 0.5 | 0.6 | 0.6 | 0.7 | 0.8 | 0.8 | 3.9% | 8.3% |
| USP | 1.2 | 1.3 | 1.2 | 1.3 | 1.4 | 1.6 | 1.7 | 1.9 | 3.8% | 9.0% |
| JP | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.6 | 0.6 | 5.6% | 9.9% |
| Reagent Grade | 1.7 | 1.8 | 1.7 | 1.9 | 2.1 | 2.3 | 2.6 | 2.8 | 4.6% | 10.5% |
| R | 0.8 | 0.9 | 0.8 | 0.9 | 1.0 | 1.1 | 1.3 | 1.4 | 4.5% | 10.5% |
| AR | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 | 4.7% | 10.8% |
| GR | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.6 | 5.3% | 10.5% |
| ACS | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 4.1% | 10.1% |
| Nutraceutical Grade (FCC) | 20.0 | 21.0 | 19.9 | 22.2 | 24.3 | 27.3 | 30.0 | 32.3 | 5.0% | 10.0% |
| Others | 8.6 | 9.0 | 8.7 | 9.7 | 10.5 | 11.7 | 12.8 | 13.6 | 5.2% | 9.1% |
| Total | 34.1 | 35.7 | 34.0 | 37.9 | 41.3 | 46.3 | 50.7 | 54.5 | 4.9% | 9.7% |

Source: Maia Research, CAREEDGE Research

Note: F: Forecast

The pharma grade citrates have demonstrated a CAGR of 23.1%, reagent grade 23.3%, and nutraceutical grade 23.9% in value terms, over CY2018-2022. The market for all these grades is expected to see a decline in value terms over CY2022-25 on account of pricing correction.

Table 11: Break-up of the Indian Citrate Industry Value by Grade (In USD Million)

| Grades | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023 F | CY2024 F | CY2025 F | CAGR | |
|----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|
| | | | | | | | | | CY2018-22 | CY2022-25F |
| Pharma Grade | 3.5 | 3.1 | 2.8 | 4.6 | 7.9 | 4.8 | 5.1 | 5.6 | 23.1% | -11.1% |
| IP | 0.6 | 0.5 | 0.5 | 0.7 | 1.3 | 0.8 | 0.8 | 0.9 | 23.0% | -11.4% |
| BP | 0.9 | 0.8 | 0.7 | 1.2 | 2.1 | 1.3 | 1.3 | 1.5 | 23.3% | -10.8% |
| EP | 0.5 | 0.4 | 0.4 | 0.7 | 1.1 | 0.7 | 0.7 | 0.8 | 22.1% | -11.5% |
| USP | 1.2 | 1.0 | 0.9 | 1.5 | 2.6 | 1.6 | 1.7 | 1.8 | 22.4% | -11.4% |
| JP | 0.3 | 0.3 | 0.3 | 0.5 | 0.8 | 0.5 | 0.5 | 0.6 | 24.6% | -10.4% |
| Reagent Grade | 1.6 | 1.4 | 1.3 | 2.1 | 3.6 | 2.2 | 2.4 | 2.6 | 23.3% | -10.0% |
| R | 0.7 | 0.6 | 0.6 | 1.0 | 1.7 | 1.0 | 1.1 | 1.2 | 23.2% | -10.3% |
| AR | 0.3 | 0.2 | 0.2 | 0.4 | 0.6 | 0.4 | 0.4 | 0.5 | 23.6% | -10.0% |
| GR | 0.3 | 0.3 | 0.3 | 0.4 | 0.8 | 0.5 | 0.5 | 0.6 | 23.6% | -9.5% |
| ACS | 0.2 | 0.2 | 0.2 | 0.3 | 0.5 | 0.3 | 0.3 | 0.4 | 22.6% | -10.7% |
| Nutraceutical Grade (FCC) | 15.5 | 14.0 | 12.7 | 21.1 | 36.5 | 22.3 | 24.0 | 26.2 | 23.9% | -10.5% |
| Others | 6.1 | 5.5 | 5.1 | 8.4 | 14.5 | 8.7 | 9.3 | 10.1 | 24.2% | -11.2% |
| Total | 26.6 | 23.9 | 21.9 | 36.2 | 62.5 | 38.0 | 40.7 | 44.5 | 23.8% | -10.7% |

Source: Maia Research, CAREEDGE Research

Note: F: Forecast

4. Global Carbonate Industry

4.1 Overview

A carbonate is a salt of carbonic acid (H₂CO₃). It is found in nature in various forms including minerals, rocks, and living organisms. Carbonate rocks, such as limestone and marble, are made up of carbonate minerals.

Further, carbonates are found in the shells of many marine animals, such as molluscs and corals. They have a wide range of industrial and commercial uses. They are used in the manufacture of cement, glass, paper, and rubber. Carbonates are also used as food additives and in pharmaceuticals.

Table 12: Types of Carbonates

| Types | Description |
|----------------------------|--|
| Sodium Carbonate | Sodium carbonate, or soda ash, is widely distributed in nature, occurring as constituents of mineral waters and as the solid minerals natron, trona, and thermonatrite. Large quantities of this alkaline salt are used in making glass, detergents, and cleansers. |
| Potassium Carbonate | Potassium carbonate is a potassium salt that is the dipotassium salt of carbonic acid. It can be used as a catalyst, a fertilizer, and a flame retardant. It is a white salt, soluble in water, forming a strong alkaline solution. It can be made as the product of potassium hydroxide's absorbent reaction with carbon dioxide. Potassium carbonate presents a large capacity to absorb moisture. |
| Calcium Carbonate | Calcium carbonate is a white, odourless powder or is available in the form of colourless crystals. It is practically insoluble in water and occurs extensively in rocks worldwide. It helps in making mortar for bonding bricks, concrete blocks, stones, roofing sheets, rubber compounds, and ceramic tiles. Calcium carbonate decomposes to form carbon dioxide and lime, an important material in making steel, glass, and paper. Precipitated Calcium Carbonate is used as a calcium source in the pharmaceutical industry as an efficient antacid neutralizer. |
| Ammonium Carbonate | Ammonium Carbonate is a colourless or white, crystalline (sand-like) powder with a strong ammonia odour. It is used in baking powders, mordant dyeing, and tanning, and as medication, reagent, and smelling salts. |
| Magnesium Carbonate | Magnesium carbonate is an antacid used for symptomatic relief of heartburn, indigestion, and upset stomach. Magnesite is a naturally occurring form of magnesium carbonate. Historically, it was mined as the mineral magnesite. In modern times, it is most commonly synthesized in a laboratory to create the purest form possible. Given its hygroscopic properties, magnesium carbonate finds effective use in industries ranging from food to cosmetics. |
| Others | The others category includes lithium carbonate, zinc carbonate, copper carbonate, lead carbonate, etc. Lithium Carbonate in medicine is used to treat manic episodes of bipolar disorder. |

Source: CAREEDGE Research

Table 13: Different Applications of Carbonate

| Applications | Description |
|-----------------|---|
| Reagents | Acids can be neutralised by carbonates, which are weak bases. Many reagent applications, including buffer solution production and pH-sensitive chemical stabilisation, make use of this characteristic. Further, metal ions from aqueous solutions can also be precipitated using carbonates since a majority of metal carbonates are water insoluble. This characteristic is helpful in many synthetic and analytical applications, including the separation of metal ions and water purification. |

| Applications | Description |
|----------------------------------|---|
| Pharmaceuticals | Carbonates are frequently used as antacids, or drugs that treat acid reflux disease and heartburn. This is due to their ability to neutralize stomach acid. Carbonates are also useful as supplements for electrolytes, which are necessary for many body processes, such as nerve transmission, muscular contraction, and fluid equilibrium. |
| Nutraceuticals | Carbonates are used in a variety of dietary supplements due to their potential health benefits such as their ability to improve bone health, reduce blood pressure, and protect against kidney stones. |
| Detergents & Cleaners | Carbonates can soften hard water by binding to calcium and magnesium ions. This makes the water more effective at dissolving dirt and grime and helps to prevent detergent scum from forming. Carbonates are alkaline substances, which means they can raise the pH of a solution. This is important for many cleaning tasks, as it helps to break down grease and grime. |
| Paints & Coatings | Carbonates are used as extenders to increase the volume of paint without sacrificing quality. This makes paint more affordable and easier to spread. Also, carbonates can be used to control the viscosity and flow of paint, helping prevent dripping and sagging. In addition, they can be used to make coatings fire-resistant. This is because carbonates release carbon dioxide when heated, which helps smother flames. |
| Paper & Pulp | Carbonates are used as fillers to increase the brightness, opacity, and smoothness of paper. They can also help to reduce the cost of paper by replacing more expensive wood pulp fibers. They can be used to remove ink from recycled paper fibers. This helps to produce brighter and cleaner recycled paper. |
| Construction | Carbonates are used as fillers in concrete to reduce costs and improve workability. They can also be used to modify the properties of concrete, such as its strength, durability, and resistance to freezing and thawing. |
| Automotive | Lithium carbonates are used as electrolytes in lithium-ion batteries, which are used in electric vehicles and hybrid vehicles. Carbonates are used in applications such as batteries, capacitors, and semiconductors. |
| Electronics | Carbonates are used as coating materials in liquid crystal displays (LCDs) and organic light-emitting diodes (OLEDs). They are also used as filler materials in display glass. |
| Glass & Ceramics | Carbonates act as fluxing agents, which means they lower the melting point of the glass or ceramic mixture. This makes it easier to process the materials and produce high-quality products. Also, carbonates can be used to produce a variety of colours in glass and ceramics. For example, iron carbonate can be used to produce green glass and copper carbonate can be used to produce blue glass. |
| Veterinary | Carbonates are used as calcium supplements in animal feed to support bone health and overall skeletal development in livestock and pets. |
| Metallurgy | Carbonates are used as a flux in the extraction of metals from ores during metallurgical processes. They also act as a flux in the refining of iron and in the production of non-ferrous metals. |
| Personal Care | Sodium Bicarbonate (baking soda) is used in toothpaste and oral care products for its mild abrasive properties and ability to neutralize acids. Calcium Carbonate is present in various personal care products, such as face powders, toothpaste, and skincare formulations, for its absorbent and abrasive qualities. |

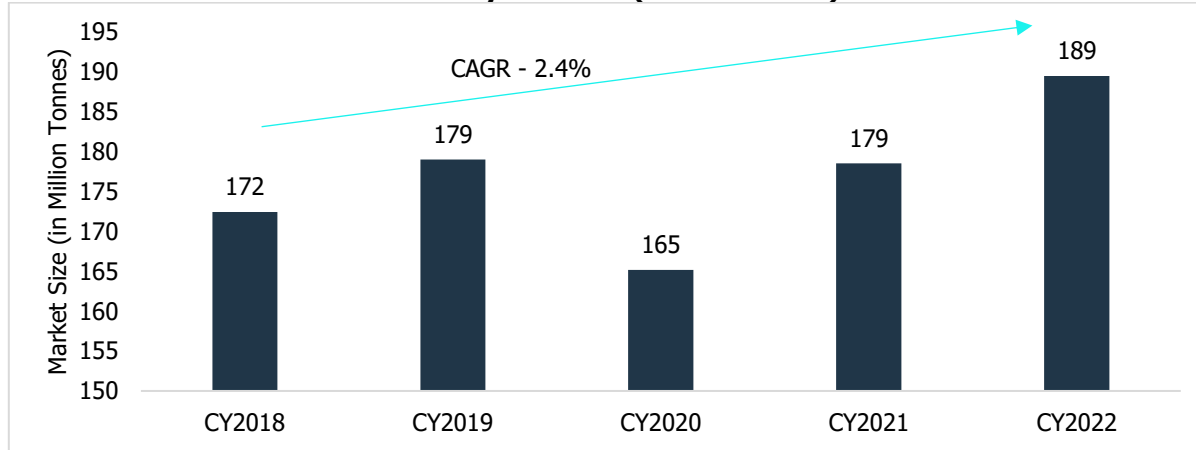
Source: CAREEDGE Research

4.2 Global Carbonate Industry – Market Size

4.2.1 Volume

The global carbonate industry volumes grew at a CAGR of 2.4% from 172 million tonnes in CY2018 to 189 million tonnes in CY2022.

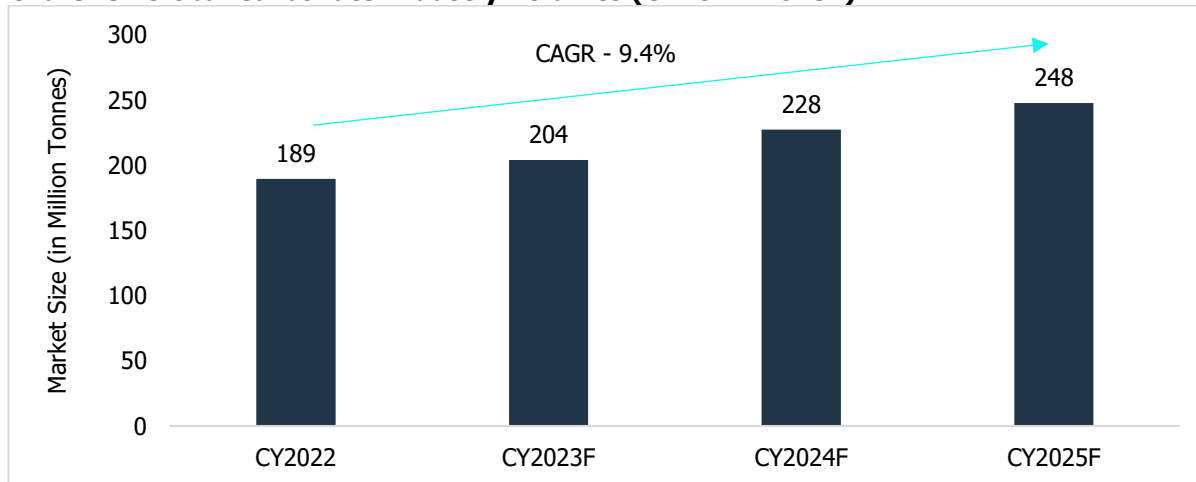
Chart 28: Global Carbonate Industry Volumes (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The global carbonate industry volumes are expected to grow from 189 million tonnes in CY2022 to 248 million tonnes in CY2025, at a CAGR of 9.4%.

Chart 29: Global Carbonate Industry Volumes (CY2022-2025F)



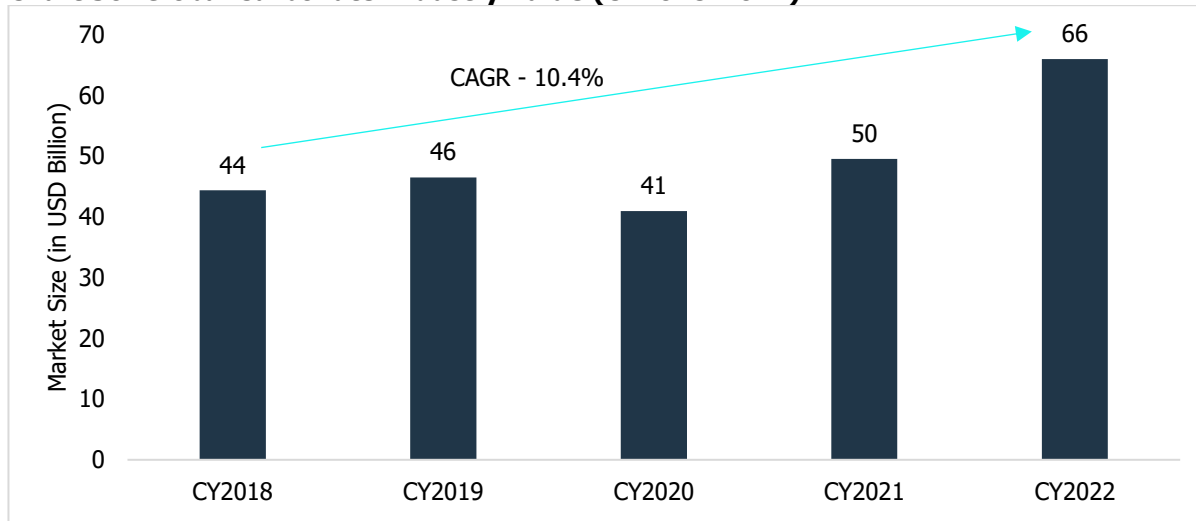
Source: Maia Research, CAREEDGE Research

Note: F – Forecasted

4.2.2 Value

The global carbonate industry grew from USD 44 billion in CY2018 to USD 66 billion in CY2022, implying a CAGR of 10.4%.

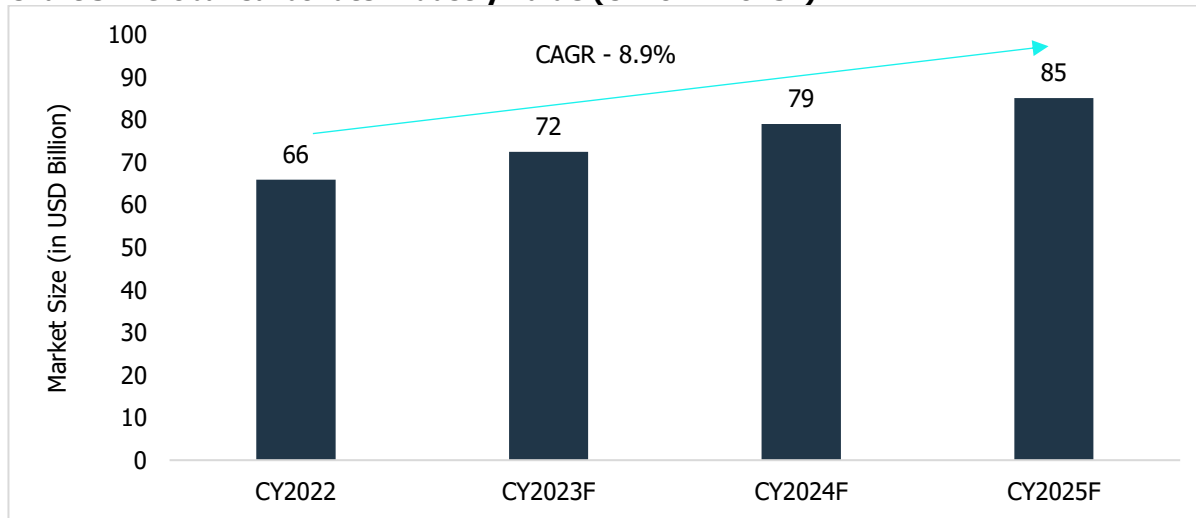
Chart 30: Global Carbonate Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The global carbonate industry is expected to grow at a CAGR of 8.9% in value terms, over the period CY2022-CY2025 to reach market size of USD 85 billion by CY2025, driven primarily by volume growth.

Chart 31: Global Carbonate Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F - Forecasted

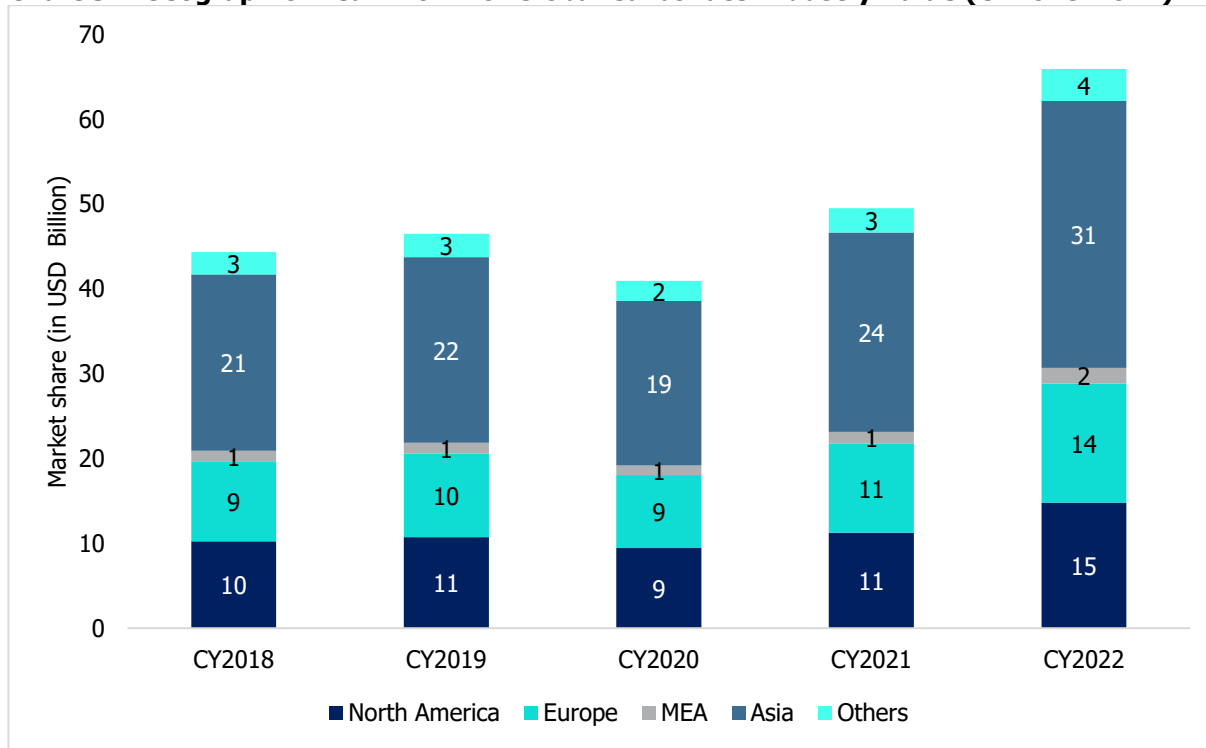
4.3 Break-Up of Global Carbonate Industry Value by Geography

Asia has the largest market for carbonates, accounting for around 48% of global demand in CY2022. Carbonate consumption in Asia has grown at a CAGR of 10.9% from CY2018 to CY2022.

North America is the second-largest market for carbonates, accounting for around 22% of global demand in CY2022. The carbonate consumption value in this region has grown at a CAGR of 9.7% during CY2018-2022.

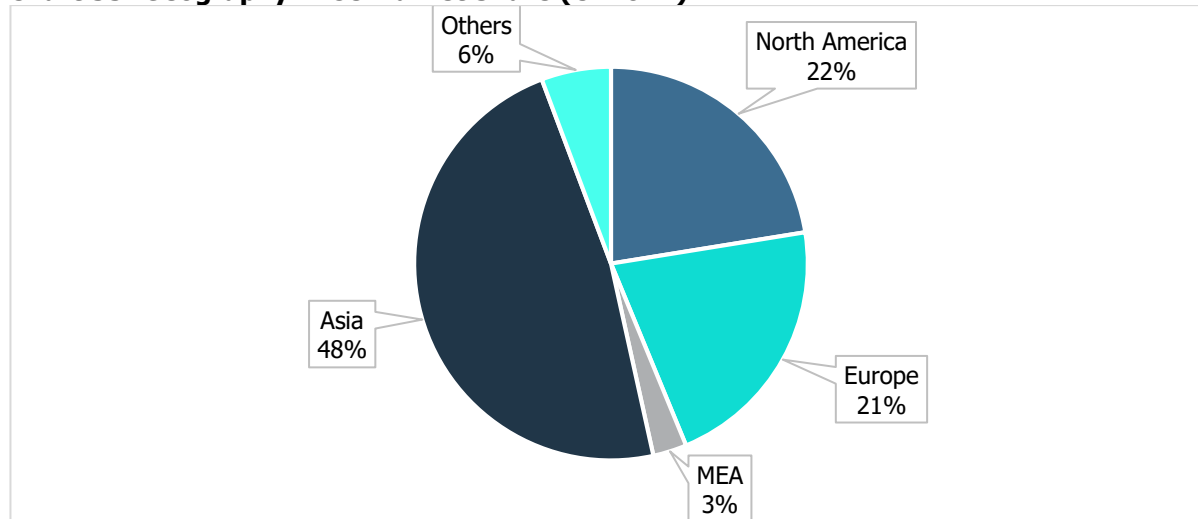
Europe is the third-largest market for carbonates, accounting for around 21% of global demand. The carbonate market in Europe has grown at a CAGR of 10.5% during CY2018-2022.

Chart 32: Geographic Break-Down of Global Carbonate Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

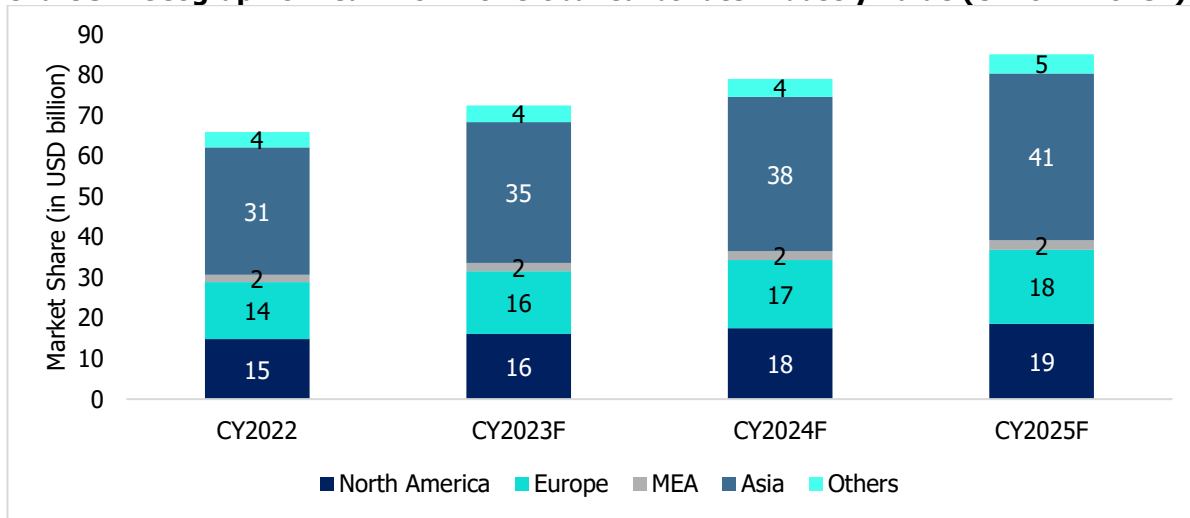
Chart 33: Geography-wise Market Share (CY2022)



Source: Maia Research, CAREEDGE Research

Asia will continue to have the largest market share followed by North America and Europe by the end of CY2025.

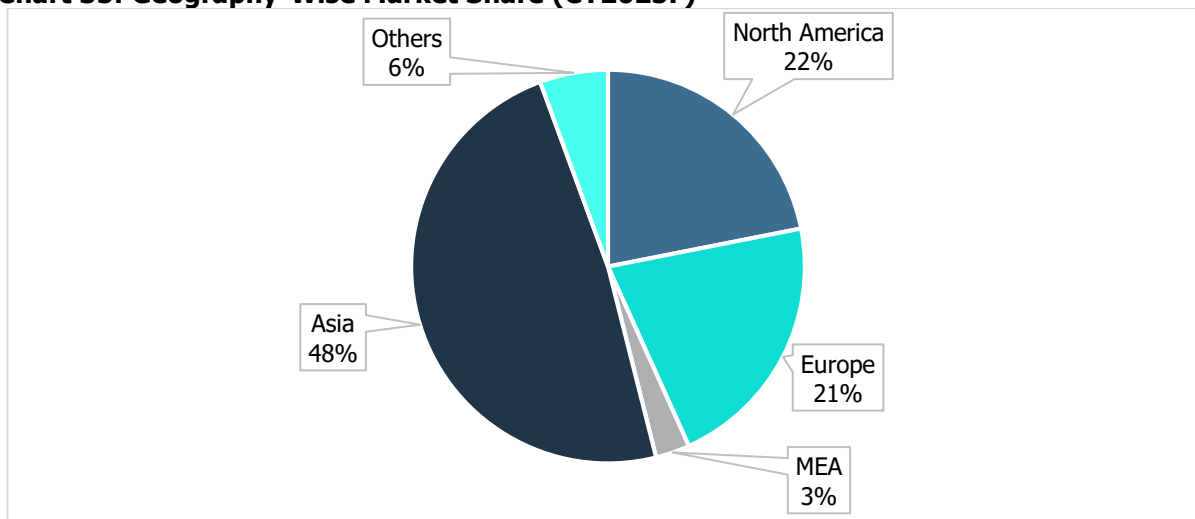
Chart 34: Geographic Break-Down of Global Carbonate Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F - Forecast

Chart 35: Geography-Wise Market Share (CY2025F)



Source: Maia Research, CAREEDGE Research

4.4 Break-up of Global Carbonate Industry by Grade

The pharma grade carbonates have demonstrated a CAGR of 3.8%, reagent grade 0.4% and nutraceutical grade 2.4% in volume terms, over CY2018-2022. The pharma grade carbonates are expected to demonstrate a CAGR of 9.9%, reagent grade 7.7% and nutraceutical grade 9.7% in volume terms, over CY2022-2025.

Table 14: Break-Up of Global Carbonate Industry Volume by Grade (in Thousand Tonnes)

| Grades | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023F | CY2024F | CY2025F | CAGR | |
|----------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|
| | | | | | | | | | CY2018-22 | CY2022-25F |
| Pharma Grade | 15.8 | 16.3 | 15.9 | 17.2 | 18.4 | 19.9 | 22.3 | 24.3 | 3.8% | 9.9% |
| IP | 3.0 | 3.1 | 3.0 | 3.3 | 3.5 | 3.8 | 4.2 | 4.6 | 3.8% | 9.7% |
| BP | 2.2 | 2.2 | 2.2 | 2.4 | 2.5 | 2.8 | 3.1 | 3.4 | 4.1% | 10.2% |
| EP | 4.1 | 4.2 | 4.0 | 4.4 | 4.6 | 5.0 | 5.6 | 6.1 | 3.3% | 9.4% |
| USP | 5.2 | 5.3 | 5.2 | 5.6 | 5.9 | 6.4 | 7.1 | 7.8 | 3.4% | 9.5% |
| JP | 1.4 | 1.5 | 1.5 | 1.6 | 1.8 | 1.9 | 2.2 | 2.5 | 6.0% | 12.0% |
| Reagent Grade | 7.8 | 8.0 | 7.1 | 7.6 | 7.9 | 8.4 | 9.2 | 9.9 | 0.4% | 7.7% |
| R | 4.3 | 4.4 | 3.9 | 4.1 | 4.3 | 4.6 | 5.0 | 5.4 | 0.4% | 7.6% |
| AR | 1.7 | 1.8 | 1.6 | 1.7 | 1.8 | 1.9 | 2.1 | 2.2 | 0.5% | 7.9% |
| GR | 1.1 | 1.1 | 1.0 | 1.1 | 1.1 | 1.2 | 1.3 | 1.4 | 0.7% | 8.0% |
| ACS | 0.7 | 0.7 | 0.6 | 0.6 | 0.7 | 0.7 | 0.8 | 0.8 | 0.2% | 7.4% |
| Nutraceutical Grade (FCC) | 92.5 | 96.2 | 88.4 | 95.8 | 101.9 | 110.1 | 123.0 | 134.3 | 2.4% | 9.7% |
| Others | 56.3 | 58.5 | 53.9 | 58.0 | 61.3 | 65.8 | 73.0 | 79.2 | 2.1% | 8.9% |
| Total | 172.4 | 179.0 | 165.2 | 178.5 | 189.5 | 204.2 | 227.5 | 247.8 | 2.4% | 9.4% |

Source: Maia Research, CAREEDGE Research

F- Forecasted

Pharma grade, reagent grade and nutraceutical grade carbonate markets grew at a CAGR of 12.0%, 8.3% and 10.5%, respectively, between CY2018 to CY2022. Consumption for these carbonates is expected to grow at a CAGR of 9.4%, 7.2% and 9.2%, respectively, between CY2022 to CY2025.

Table 15: Break-Up of Global Carbonate Industry Value by Grade (in USD Billion)

| Grades | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023F | CY2024F | CY2025F | CAGR | |
|----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|
| | | | | | | | | | CY2018-22 | CY2022-25F |
| Pharma Grade | 5.4 | 5.7 | 5.3 | 6.4 | 8.6 | 9.5 | 10.4 | 11.2 | 12.0% | 9.4% |
| IP | 1.0 | 1.0 | 0.9 | 1.1 | 1.5 | 1.7 | 1.8 | 2.0 | 12.0% | 9.2% |
| BP | 0.7 | 0.8 | 0.7 | 0.9 | 1.2 | 1.3 | 1.4 | 1.6 | 12.3% | 9.7% |
| EP | 1.4 | 1.5 | 1.3 | 1.6 | 2.2 | 2.4 | 2.6 | 2.8 | 11.5% | 8.9% |
| USP | 1.8 | 1.9 | 1.8 | 2.1 | 2.8 | 3.1 | 3.4 | 3.7 | 11.6% | 9.1% |
| JP | 0.5 | 0.5 | 0.5 | 0.6 | 0.8 | 0.9 | 1.1 | 1.2 | 14.3% | 11.5% |
| Reagent Grade | 2.5 | 2.6 | 2.2 | 2.6 | 3.4 | 3.7 | 4.0 | 4.2 | 8.3% | 7.2% |
| R | 1.3 | 1.3 | 1.1 | 1.4 | 1.8 | 1.9 | 2.1 | 2.2 | 8.3% | 7.1% |
| AR | 0.5 | 0.6 | 0.5 | 0.6 | 0.8 | 0.8 | 0.9 | 0.9 | 8.4% | 7.4% |
| GR | 0.4 | 0.4 | 0.3 | 0.4 | 0.5 | 0.6 | 0.6 | 0.6 | 8.6% | 7.5% |
| ACS | 0.3 | 0.3 | 0.2 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 8.0% | 6.9% |
| Nutraceutical Grade (FCC) | 23.7 | 24.9 | 21.9 | 26.5 | 35.4 | 39.0 | 42.7 | 46.0 | 10.5% | 9.2% |
| Others | 12.7 | 13.3 | 11.6 | 14.0 | 18.6 | 20.3 | 22.1 | 23.7 | 10.0% | 8.4% |
| Total | 44.3 | 46.5 | 41.0 | 49.5 | 65.9 | 72.5 | 79.1 | 85.1 | 10.4% | 8.9% |

Source: Maia Research, CAREEDGE Research

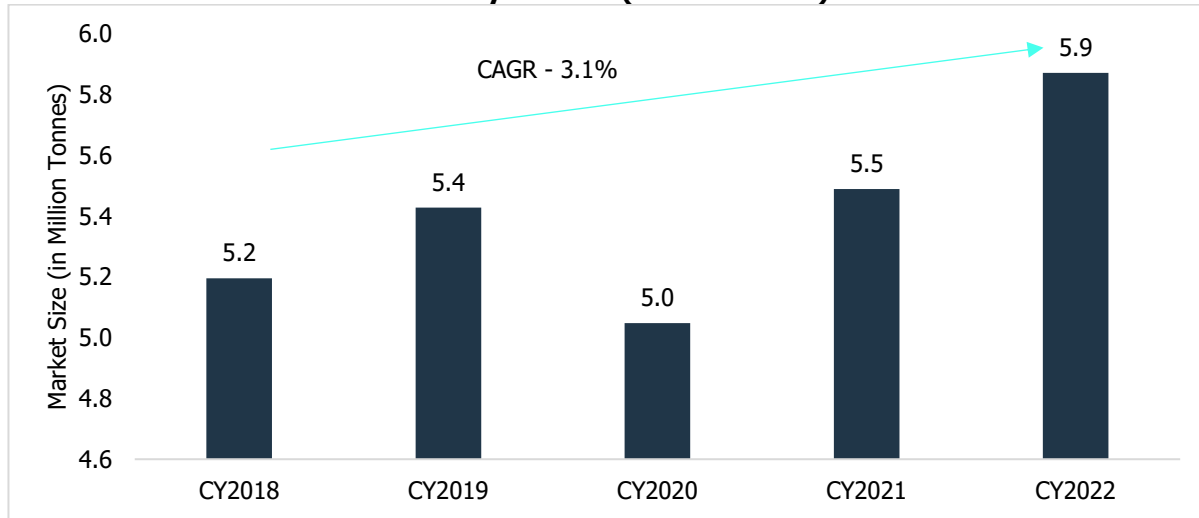
F- Forecasted

4.5 Indian Carbonate Industry

4.5.1 Volume

The Indian carbonate industry volumes grew at a CAGR of 3.1% from 5.2 million tonnes in CY2018 to 5.9 million tonnes in FY2022.

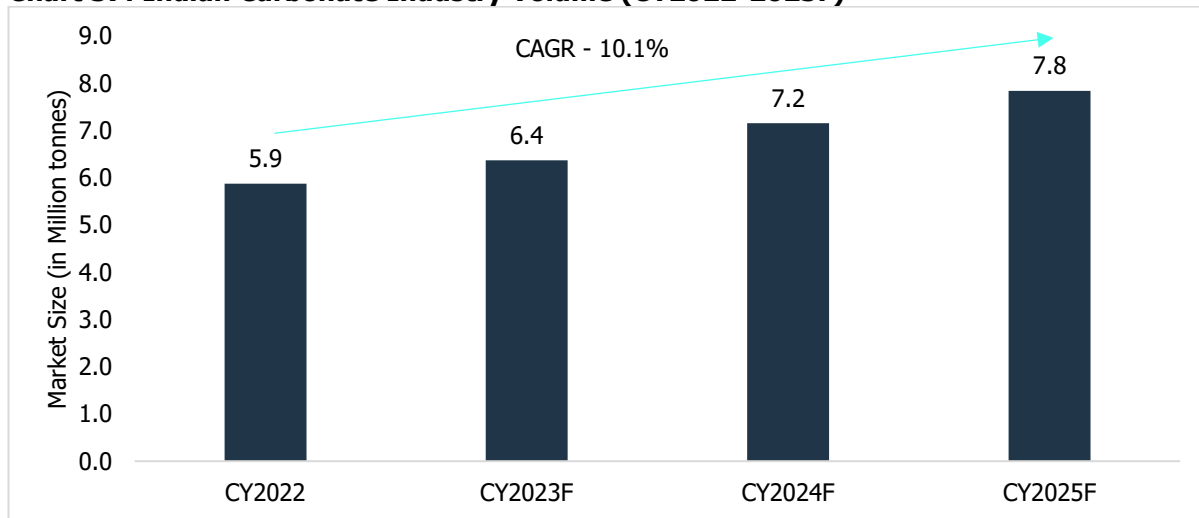
Chart 36: Indian Carbonate Industry Volume (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The Indian carbonate industry volumes are expected to grow from 5.9 million tonnes in CY2022 to 7.8 million tonnes in CY2025, at a CAGR of 10.1%.

Chart 37: Indian Carbonate Industry Volume (CY2022-2025F)



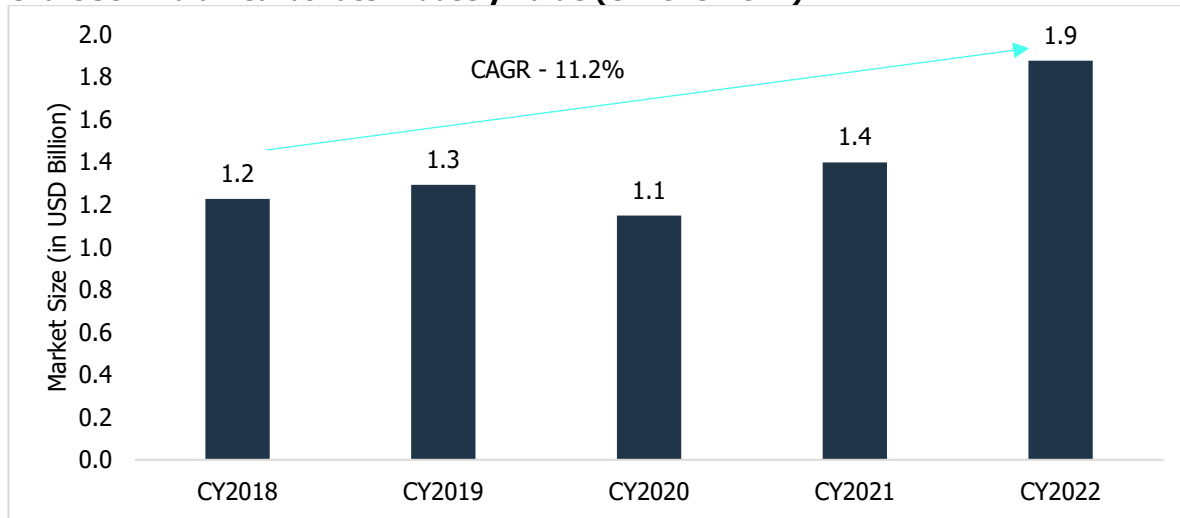
Source: Maia Research, CAREEDGE Research

Note: F: Forecast

4.5.2 Value

The Indian carbonate industry grew from USD 1.2 billion in CY2018 to USD 1.9 billion in CY2022, implying a CAGR of 11.2%.

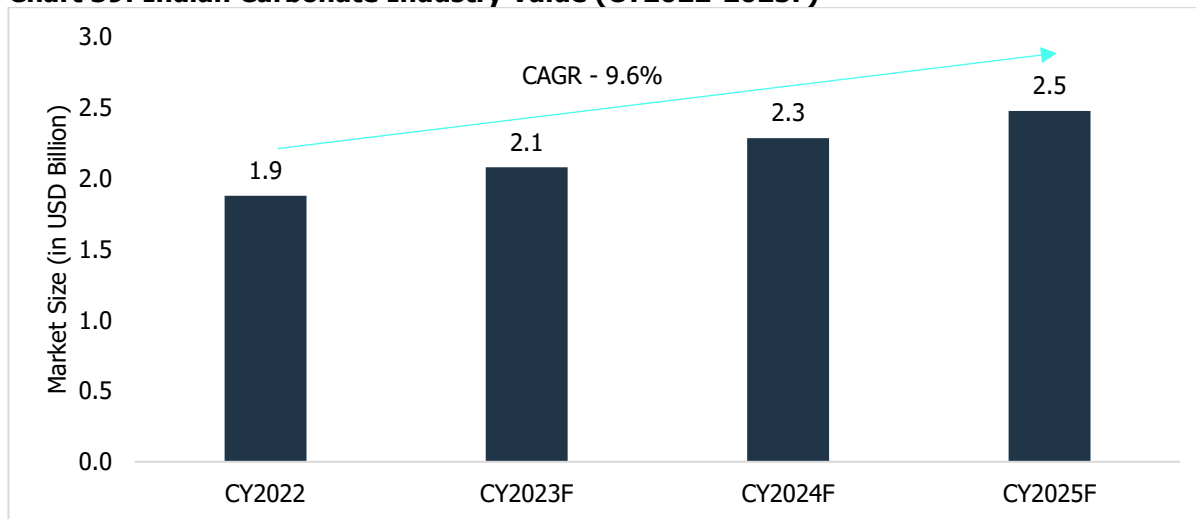
Chart 38: Indian Carbonate Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The Indian carbonate industry is expected to grow from USD 1.9 billion in CY2022 to USD 2.5 billion in CY2025, implying a CAGR of 9.6%, driven primarily by volume growth.

Chart 39: Indian Carbonate Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F: Forecast

4.5.3 Break-up of Indian Carbonate Industry by Grade

The pharma grade carbonates have demonstrated a CAGR of 4.5%, reagent grade 1.1%, and nutraceutical grade 3.2% in volume terms, over CY2018-2022. The pharma grade carbonates are expected to demonstrate a CAGR of 10.6%, reagent grade 8.5% and nutraceutical grade 10.4% in volume terms, over CY2022-2025.

Table 16: Break-Up of Indian Carbonate Industry Volume by Grade (in Thousand Tonnes)

| Grades | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023F | CY2024F | CY2025F | CAGR | |
|----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| | | | | | | | | | CY2018-22 | CY2022-25F |
| Pharma Grade | 444 | 461 | 451 | 493 | 530 | 577 | 652 | 717 | 4.5% | 10.6% |
| IP | 95 | 98 | 97 | 105 | 113 | 123 | 139 | 153 | 4.4% | 10.6% |
| BP | 62 | 65 | 64 | 70 | 75 | 82 | 93 | 103 | 4.9% | 11.2% |
| EP | 106 | 109 | 107 | 116 | 124 | 135 | 151 | 166 | 4.0% | 10.2% |
| USP | 149 | 155 | 151 | 164 | 176 | 191 | 215 | 236 | 4.3% | 10.3% |
| JP | 32 | 34 | 34 | 38 | 42 | 47 | 54 | 60 | 7.0% | 12.6% |
| Reagent Grade | 183 | 189 | 170 | 182 | 191 | 204 | 226 | 244 | 1.1% | 8.5% |
| R | 105 | 108 | 97 | 104 | 110 | 117 | 129 | 139 | 1.2% | 8.1% |
| AR | 38 | 39 | 35 | 38 | 40 | 42 | 47 | 51 | 1.3% | 8.4% |
| GR | 27 | 27 | 25 | 27 | 28 | 30 | 33 | 36 | 0.9% | 8.7% |
| ACS | 14 | 14 | 13 | 13 | 14 | 15 | 17 | 18 | 0.0% | 8.7% |
| Nutraceutical Grade (FCC) | 2546 | 2663 | 2465 | 2688 | 2883 | 3134 | 3530 | 3878 | 3.2% | 10.4% |
| Others | 2024 | 2115 | 1962 | 2126 | 2268 | 2451 | 2743 | 2997 | 2.9% | 9.7% |
| Total | 5196 | 5428 | 5048 | 5489 | 5872 | 6367 | 7151 | 7837 | 3.1% | 10.1% |

Source: Maia Research, CAREEDGE Research

Note: F: Forecast

Pharma grade, reagent grade, and nutraceutical grade carbonates consumption in India has grown at a CAGR of 12.8%, 9.1%, and 11.3%, respectively, during CY2018-CY2022. The consumption of these chemicals is expected to grow at a CAGR of 10.2%, 8.0%, and 9.9%, respectively, over FY2022-FY2025.

Table 17: Break-Up of Indian Carbonate Industry Value by Grade (in USD Million)

| Grades | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023F | CY2024F | CY2025F | CAGR | |
|----------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|--------------|
| | | | | | | | | | CY2018-22 | CY2022-25F |
| Pharma Grade | 129.3 | 135.6 | 126.8 | 155.1 | 209.1 | 232.5 | 256.9 | 279.6 | 12.8% | 10.2% |
| IP | 25.8 | 27.0 | 25.3 | 30.9 | 41.8 | 46.2 | 51.3 | 55.6 | 12.8% | 10.0% |
| BP | 18.7 | 19.7 | 18.5 | 22.6 | 30.6 | 34.1 | 37.8 | 41.3 | 13.1% | 10.5% |
| EP | 30.9 | 32.3 | 30.0 | 36.6 | 49.1 | 54.3 | 59.8 | 64.8 | 12.3% | 9.7% |
| USP | 44.6 | 46.7 | 43.4 | 53.0 | 71.1 | 78.9 | 86.7 | 94.2 | 12.4% | 9.8% |
| JP | 9.3 | 10.0 | 9.6 | 12.0 | 16.6 | 18.9 | 21.3 | 23.7 | 15.6% | 12.7% |
| Reagent Grade | 49.9 | 51.9 | 44.6 | 53.5 | 70.7 | 77.0 | 83.4 | 89.0 | 9.1% | 8.0% |
| R | 27.1 | 28.2 | 24.3 | 29.0 | 38.4 | 41.8 | 45.3 | 48.3 | 9.1% | 7.9% |
| AR | 10.1 | 10.6 | 9.1 | 10.9 | 14.4 | 15.7 | 17.0 | 18.2 | 9.2% | 8.1% |
| GR | 7.8 | 8.2 | 7.0 | 8.4 | 11.2 | 12.2 | 13.3 | 14.2 | 9.4% | 8.3% |
| ACS | 4.8 | 5.0 | 4.3 | 5.1 | 6.7 | 7.3 | 7.9 | 8.4 | 8.8% | 7.7% |
| Nutraceutical Grade (FCC) | 596.3 | 629.9 | 556.8 | 679.5 | 914.5 | 1014.5 | 1118.7 | 1215.5 | 11.3% | 9.9% |
| Others | 451.1 | 476.4 | 420.9 | 510.5 | 682.9 | 753.0 | 825.2 | 891.1 | 10.9% | 9.3% |
| Total | 1226.5 | 1293.8 | 1149.2 | 1398.6 | 1877.3 | 2077.0 | 2284.2 | 2475.3 | 11.2% | 9.7% |

Source: Maia Research, CAREEDGE Research

Note: F: Forecast

5. Global Phosphate Industry

5.1 Overview

The global phosphate industry plays a vital role in agriculture and several industrial applications. Phosphate rock, primarily sourced from countries like China, Morocco, the United States, and Russia, serves as the main reservoir of phosphorus, an essential element for the growth of plants and animals.

Table 18: Types of Phosphates

| Types | Description |
|----------------------------|---|
| Sodium Phosphate | Sodium phosphate, a colourless or white crystalline powder or granules, is produced by neutralizing phosphoric acid with sodium hydroxide or sodium carbonate under controlled conditions. A major application of sodium phosphate is as a food additive, serving various purposes such as emulsification, stabilization, and leavening. It is also used for the regulation of pH levels in processed foods. |
| Potassium Phosphate | Potassium phosphate, formed by mixing phosphoric acid and potassium hydroxide, includes variations like monopotassium phosphate (MKP), dipotassium phosphate (DKP), and tetrapotassium pyrophosphate (TKPP). Monopotassium phosphate (MKP) is used in beverages, coffee creamers, cheese, and fortification. Whereas dipotassium phosphate (DKP) functions as a buffering agent in food processing and corrosion control in cooling systems. Tetrapotassium pyrophosphate (TKPP) is employed in water treatment, beverages, and various technical applications like textiles and paints for its deflocculant and dispersant properties. |
| Calcium Phosphate | Calcium phosphates are used as diluents in pharmaceuticals, while Monocalcium Phosphate acts as a leavening agent and Dicalcium Phosphate provides calcium and phosphorus in food products. Tricalcium Phosphate serves as a mineral supplement and anticaking agent in food and beverages. |
| Ammonium Phosphate | Ammonium phosphate, such as monoammonium phosphate and diammonium phosphate, is a salt formed from ammonia and phosphoric acid. It serves various purposes, including as a leavening agent in foods and an effective water-soluble fertilizer that facilitates plant growth and root development. Additionally, ammonium phosphate is a key component in dry chemical fire extinguishers and flame retardant applications, where it effectively suppresses flames by covering the fuel source. |
| Others | Other phosphates include Feed-grade and Industrial-grade. |

Source: CAREEDGE Research

Table 19: Application of Phosphates

| Applications Description | Applications Description |
|-----------------------------------|---|
| Pharmaceuticals | In the pharmaceutical industry, phosphates are employed as excipients and active ingredients in drug formulations. They serve as disintegrants, binders, and fillers in tablet and capsule production. Additionally, some phosphate compounds have therapeutic uses, such as potassium phosphate for electrolyte replacement in intravenous solutions. |
| Nutraceuticals | Phosphates are incorporated into nutraceutical products, which combine nutritional and pharmaceutical characteristics. They are used as dietary supplements to provide essential phosphorus and other minerals to promote bone health and overall well-being. Phosphate salts are a common source of phosphorus in nutraceuticals, supporting various bodily functions. |
| Reagents | Phosphates are commonly used as buffering agents in laboratory reagents and biochemical assays. They help maintain a stable pH level in various chemical reactions, ensuring accurate and reliable results. Their ability to control acidity or alkalinity is crucial in chemical analyses and diagnostics. |
| Agrochemicals | Agrochemicals, which encompass chemical formulations, serve to manage pests and pathogens and provide soil nutrients. Phosphates find extensive use in agriculture, primarily as phosphate and compound fertilizers. They are also integral in producing organophosphorus pesticides, including herbicides and insecticides. |
| Food and Feed | The food industry comprises businesses involved in transforming raw agricultural materials into consumer food products. The feed industry specializes in the production of animal feeds for a wide range of animals, including those in production, as pets, or under human care, including wild and exotic species. The feed industry also contributes to aquaculture by manufacturing feed ingredients. Phosphates are indispensable nutritional supplements used in both food products and animal feed. Furthermore, phosphates find applications as food additives. |
| Cleansers & Detergents | The cleanser product line encompasses various submarkets, including laundry detergent, laundry care, household cleaners, and dishwashing detergent. Detergent refers to a substance or a combination of soaps and/or surfactants, which are organic substances, designed for the purpose of washing and cleaning. |
| Veterinary | Phosphates are used in veterinary medicine as dietary supplements for livestock and pets. They play a crucial role in animal nutrition, supporting bone health, metabolism, and overall growth. |
| Biotech | Phosphates are utilized in biotechnology for various purposes, including as buffers in laboratory experiments, cell culture media, and as components in DNA and RNA isolation procedures. |
| Metallurgy | Phosphates are used in metallurgy as fluxing agents and inhibitors to control the formation of undesirable impurities during the smelting and refining processes. They also find applications in metal surface treatment. |
| Electronics | In electronics, phosphates are used in the production of electronic components and as additives in some electronic materials. For example, they can be used in the manufacturing of certain types of ceramics and as a component in the production of semiconductor materials. |

Personal Care

Phosphates are used in the personal care and cosmetics industries as additives in various products. They may be found in shampoos, conditioners, and other hair care products, as well as in some skincare formulations.

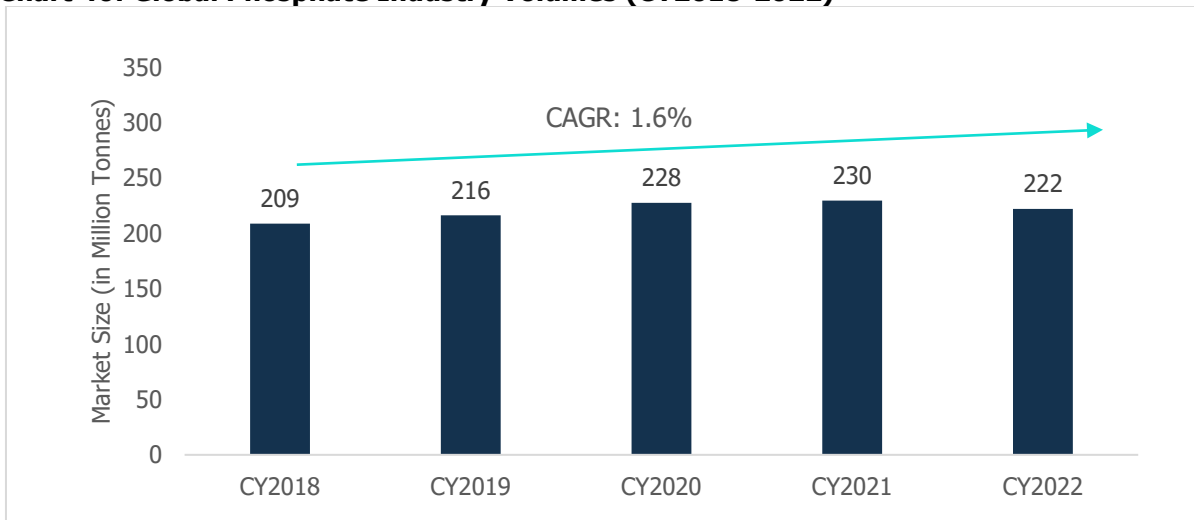
Source: CAREEDGE Research

5.2 Global Phosphate Industry – Market Size

5.2.1 Volume

Global phosphate industry volumes have grown at a CAGR of 1.6% from 209 million tonnes in CY2018 to 222 million tonnes in CY2022.

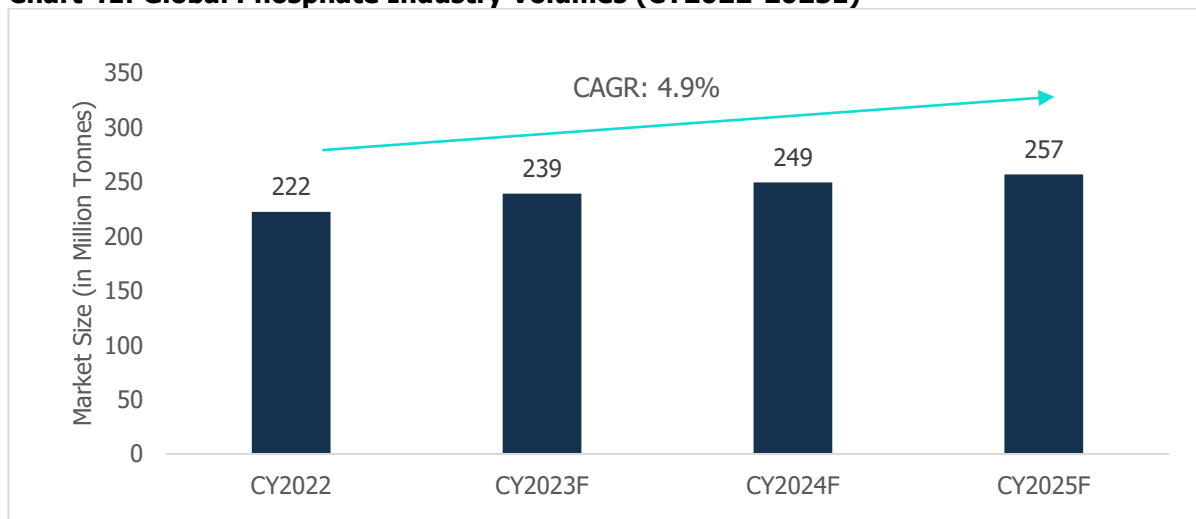
Chart 40: Global Phosphate Industry Volumes (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The industry volumes are expected to grow at a CAGR of 4.9% from 222 million tonnes in CY2022 to 257 million tonnes in CY2025.

Chart 41: Global Phosphate Industry Volumes (CY2022-2025E)



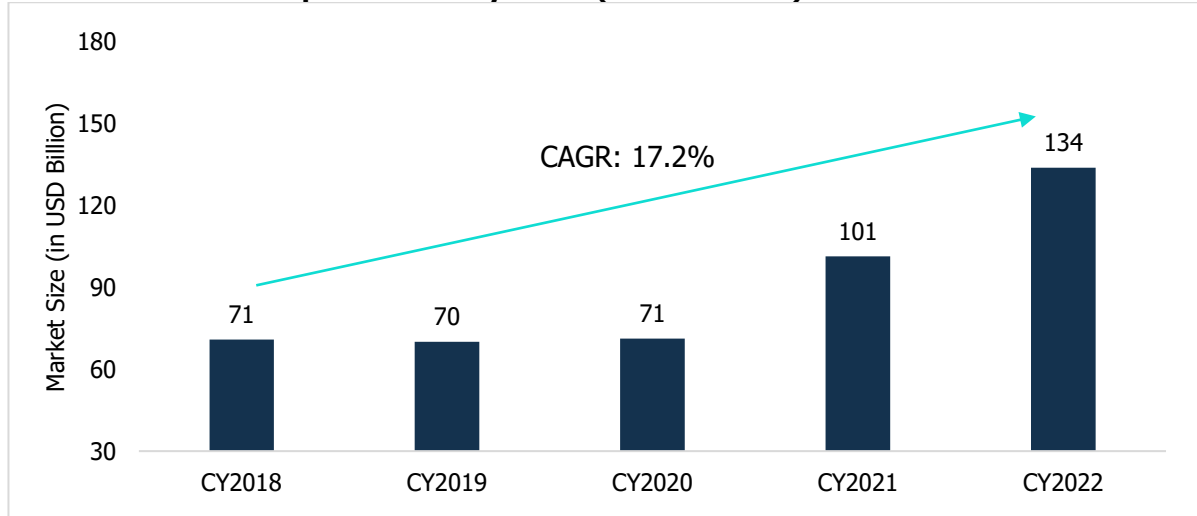
Source: Maia Research, CAREEDGE Research

Note: F: Forecast

5.2.2 Value

The global phosphate industry has witnessed a CAGR of 17.2%, with global consumption increasing from USD 71 billion in CY2018 to USD 134 billion in CY2022. Notably, there was a substantial price increase of about 75% between CY2018 and CY2022.

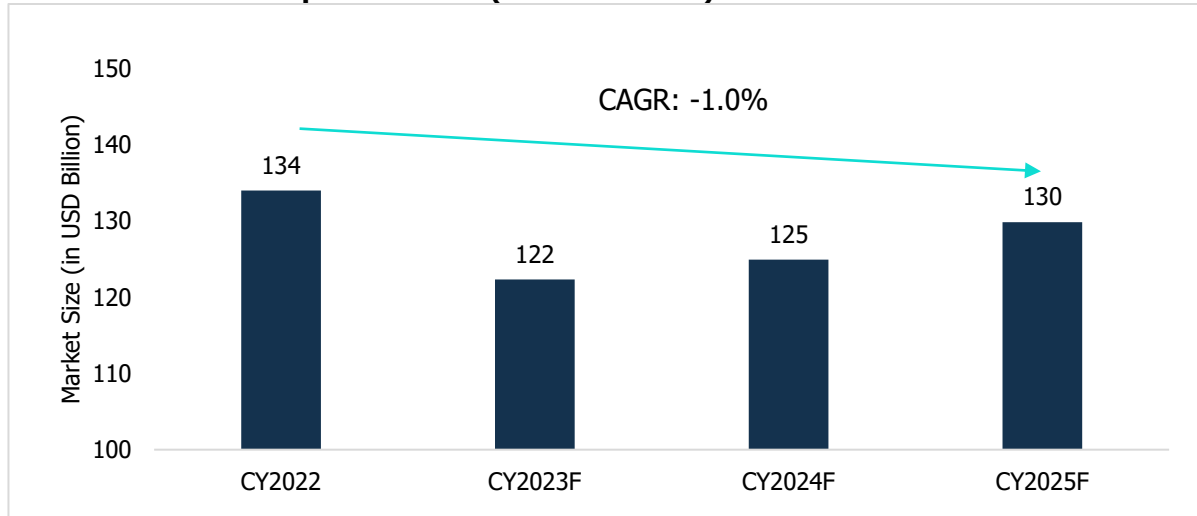
Chart 42: Global Phosphate Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The global phosphate industry size is expected to decline from USD 134 billion in CY2022 to USD 130 billion in CY2025. While the volumes are expected to grow at a CAGR of 4.9% during this period, the prices are expected to decline from CY2022 highs, leading to a decline in market size.

Chart 43: Global Phosphate Market (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F: Forecast

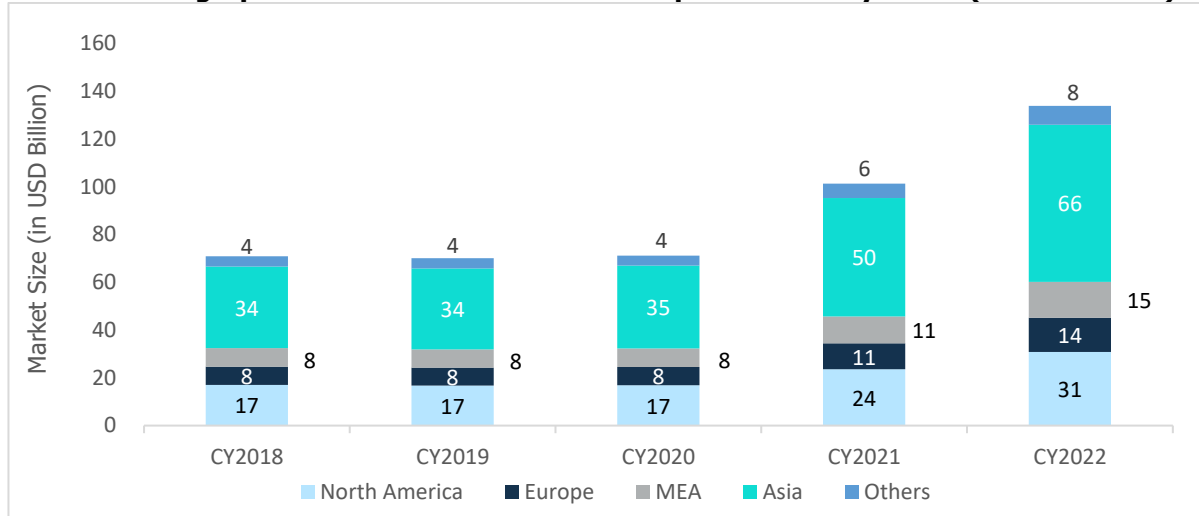
5.3 Break-Up of Global Phosphate Industry Value by Geography

Asia is the largest market for phosphates, accounting for 49% of the global market share in CY2022. The region recorded growth at a CAGR of 17.8% from CY2018 to CY2022.

Whereas, the North American region is the second-largest market for phosphates, representing 23% of the global market share in CY2022. The North America market witnessed a CAGR of 16% from CY2018 to CY2022.

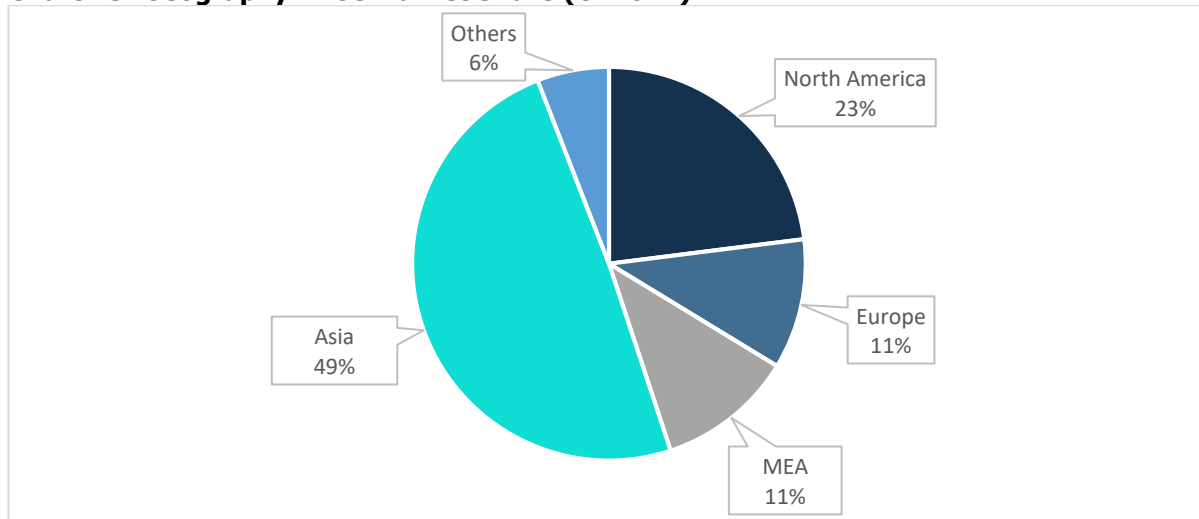
Furthermore, both the European and MEA regions are the world's third-largest markets for phosphates, with each region commanding an 11% share of the global market in CY2022. It is noteworthy that the European region has achieved a CAGR of 16.9% and the MEA region has achieved a CAGR of 18% during the period CY2018 to CY2022.

Chart 44: Geographic Break-Down of Global Phosphate Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

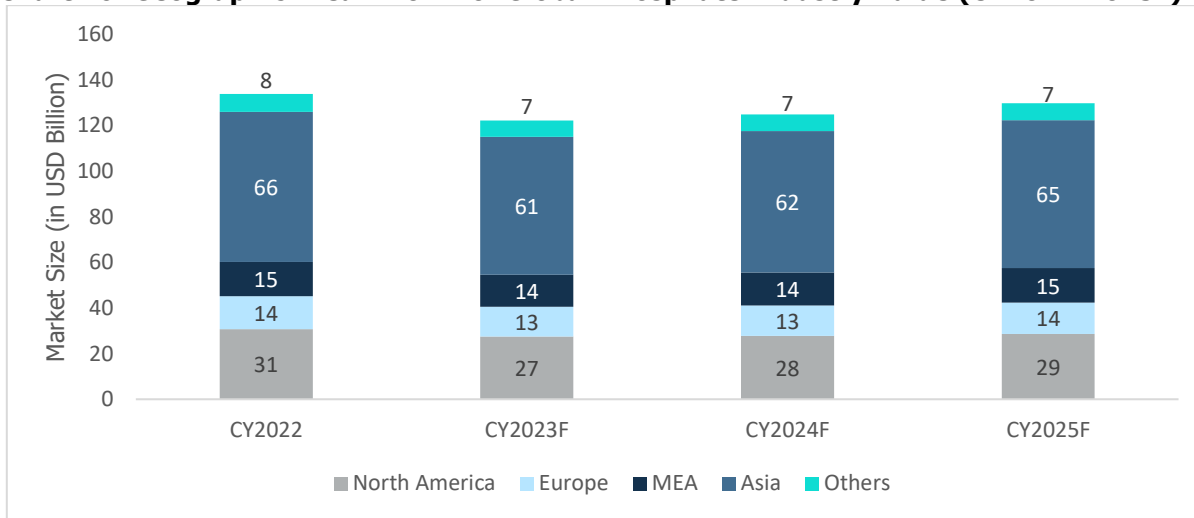
Chart 45: Geography-Wise Market Share (CY2022)



Source: Maia Research, CAREEDGE Research

Asia is expected to remain the largest market for phosphates with an expected contribution of around 50% by CY2025.

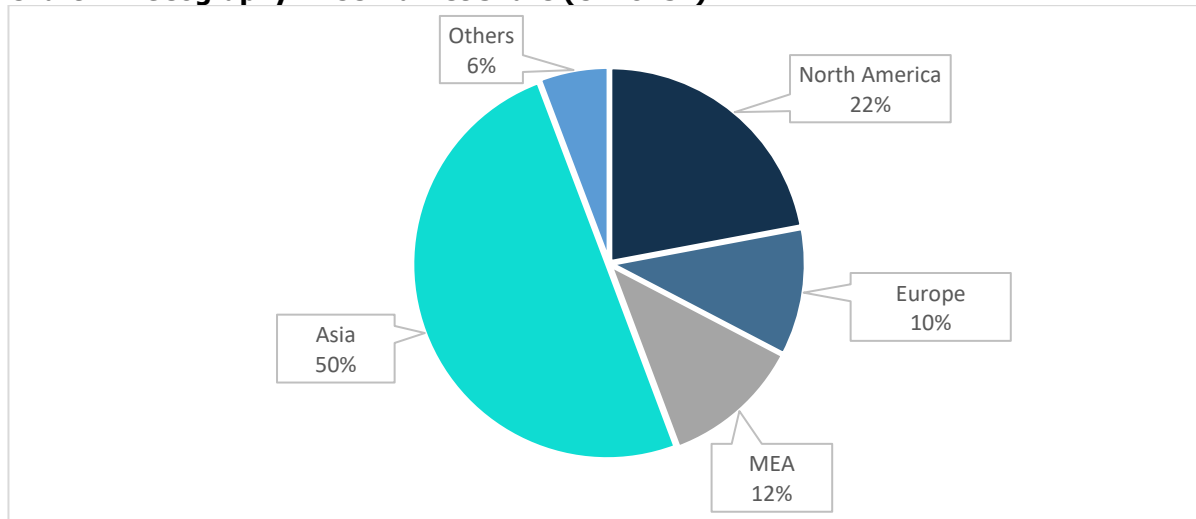
Chart 46: Geographic Break-Down of Global Phosphate Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F: Forecast

Chart 47: Geography-Wise Market Share (CY2025F)



Source: Maia Research, CAREEDGE Research

5.4 Break-Up of Global Phosphate Industry by Grade

The pharma grade phosphates have demonstrated a CAGR of 3.0%, reagent grade -0.4% and nutraceutical grade 1.6% in volume terms, over CY2018-2022. The pharma grade phosphates are expected to demonstrate a CAGR of 5.4%, reagent grade 3.3% and nutraceutical grade 5.2% in volume terms, over CY2022-2025.

Table 20: Break-up of Global Phosphate Industry Volume by Grade (In Million Tonnes)

| Grades | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023F | CY2024F | CY2025F | CAGR | |
|----------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|-------------|
| | | | | | | | | | CY2018-22 | CY2022-25F |
| Pharma Grade | 13 | 13 | 15 | 15 | 14 | 16 | 16 | 17 | 3.0% | 5.4% |
| IP | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 3.0% | 5.3% |
| BP | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3.3% | 5.7% |
| EP | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 2.5% | 4.9% |
| USP | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 2.6% | 5.1% |
| JP | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 4.9% | 7.4% |
| Reagent Grade | 6 | 6 | 7 | 7 | 6 | 7 | 7 | 7 | -0.4% | 3.3% |
| R | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | -0.4% | 3.2% |
| AR | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | -0.3% | 3.5% |
| GR | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | -0.1% | 3.6% |
| ACS | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | -0.6% | 3.1% |
| Nutraceutical Grade (FCC) | 80 | 83 | 87 | 88 | 86 | 92 | 97 | 100 | 1.6% | 5.2% |
| Others | 109 | 113 | 119 | 120 | 116 | 124 | 129 | 133 | 1.5% | 4.7% |
| Total | 209 | 216 | 228 | 230 | 222 | 239 | 249 | 257 | 1.6% | 4.9% |

Source: Maia Research, CAREEDGE Research

Note: F: Forecasted

The pharma-grade phosphates have demonstrated a CAGR of 18.9%, reagent grade 15% and nutraceutical grade 17.3% in value terms, over CY2018-2022. The market for all these grades is expected to see a decline in value terms over CY2022-25 on account of pricing correction.

Table 21: Break-up of Global Phosphate Industry Value by Grade (In USD Billion)

| Grades | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023F | CY2024F | CY2025F | CAGR | |
|----------------------------------|-----------|-----------|-----------|------------|------------|------------|------------|------------|--------------|--------------|
| | | | | | | | | | CY2018-22 | CY2022-25F |
| Pharma Grade | 5 | 5 | 6 | 8 | 11 | 10 | 10 | 11 | 18.9% | -0.6% |
| IP | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 18.8% | -0.7% |
| BP | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 19.2% | -0.3% |
| EP | 1 | 1 | 1 | 2 | 3 | 2 | 2 | 3 | 18.3% | -1.0% |
| USP | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 18.4% | -0.9% |
| JP | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 21.1% | 1.2% |
| Reagent Grade | 3 | 2 | 2 | 3 | 4 | 4 | 4 | 4 | 15.0% | -2.5% |
| R | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 15.0% | -2.6% |
| AR | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 15.1% | -2.4% |
| GR | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 15.3% | -2.3% |
| ACS | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 14.7% | -2.8% |
| Nutraceutical Grade (FCC) | 27 | 27 | 27 | 39 | 52 | 47 | 49 | 51 | 17.3% | -0.8% |
| Others | 36 | 35 | 36 | 51 | 67 | 61 | 62 | 65 | 17.1% | -1.2% |
| Total | 71 | 70 | 71 | 101 | 134 | 122 | 125 | 130 | 17.2% | -1.0% |

Source: Maia Research, CAREEDGE Research

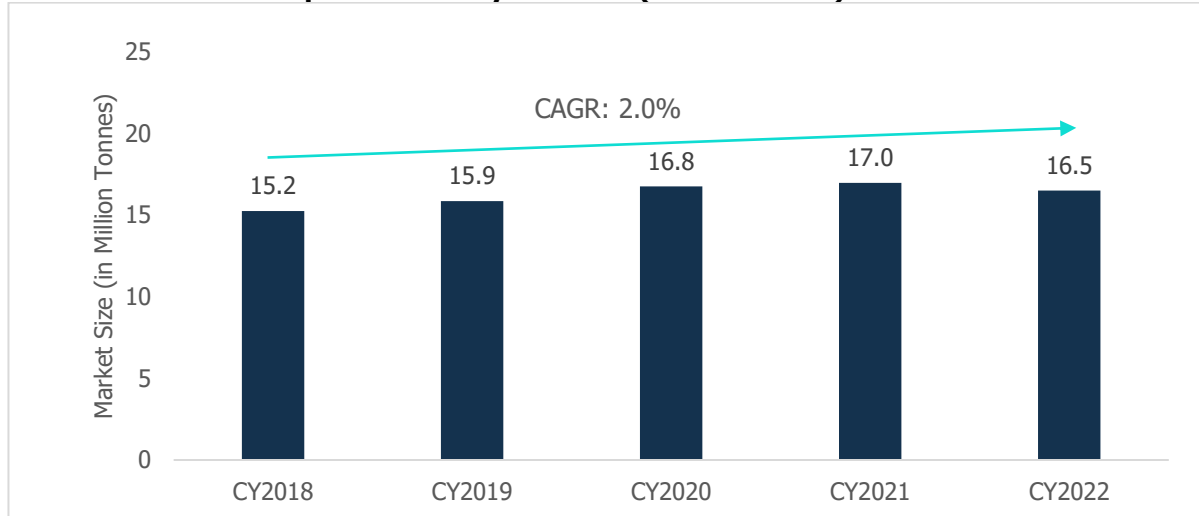
Note: F: Forecasted

5.5 Indian Phosphate Industry

5.5.1 Volume

The Indian phosphate industry volumes grew at a CAGR of 2% from 15.2 million tonnes in CY2018 to 16.5 million tonnes in CY2022.

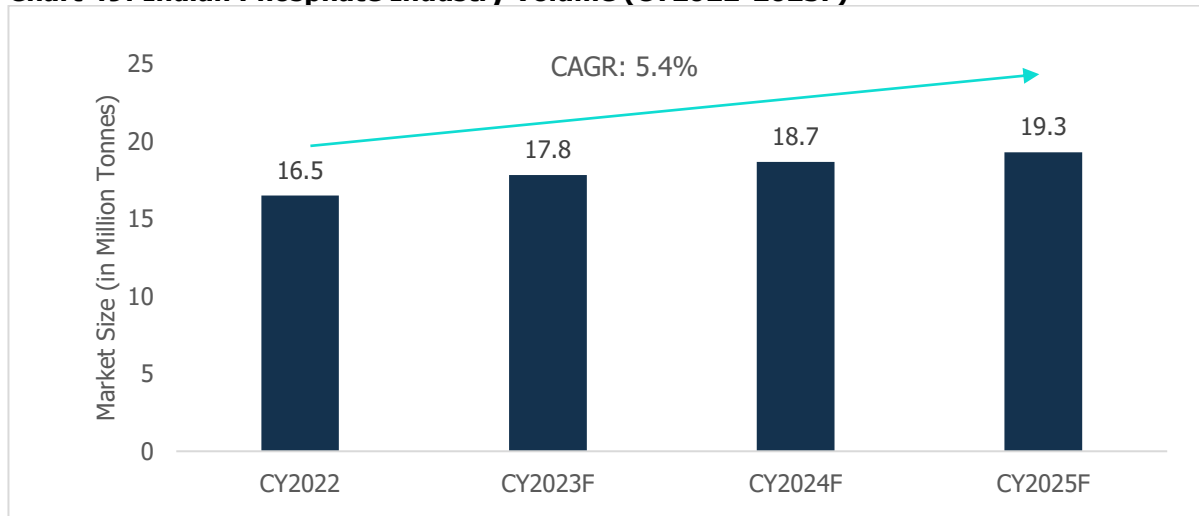
Chart 48: Indian Phosphate Industry Volumes (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The Indian phosphate industry volumes are expected to increase from 16.5 million tonnes in CY2022 to 19.3 million tonnes in CY2025, at a CAGR of 5.4%.

Chart 49: Indian Phosphate Industry Volume (CY2022-2025F)



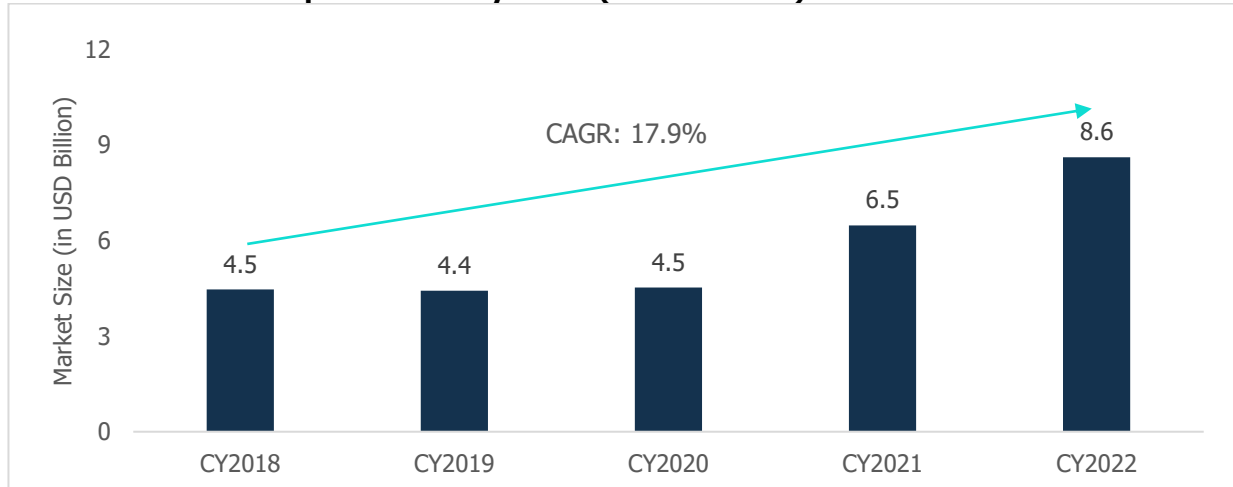
Source: Maia Research, CAREEDGE Research

Note: F: Forecast

5.5.2 Value

The Indian phosphate industry grew at a CAGR of 17.9% from USD 4.5 billion in CY2018 to USD 8.6 billion in CY2022.

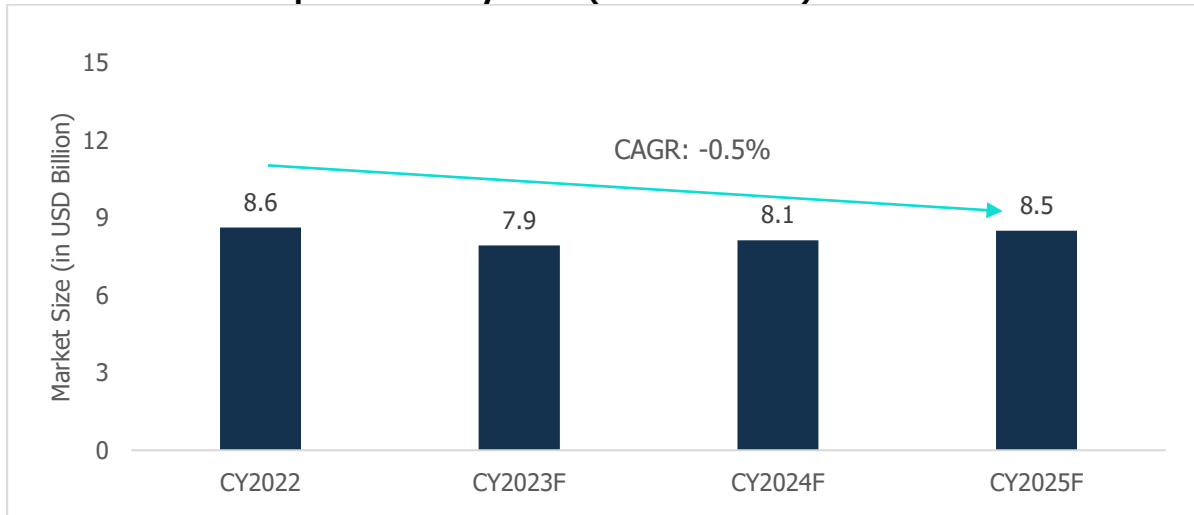
Chart 50: Indian Phosphate Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The phosphate industry is expected to witness a revenue decline from USD 8.6 billion in CY2022 to USD 8.5 billion in CY2025, at a negative CAGR of approximately 0.5%. While the volumes are expected to grow at a CAGR of 5.4% over this period, the market value is expected to decline on account of price correction from the highs touched in CY2022.

Chart 51: Indian Phosphate Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F: Forecast

5.5.3 Break-Up of Indian Phosphate Industry by Grade

The pharma grade phosphates have demonstrated a CAGR of 3.4% and nutraceutical grade 2.1% in volume terms, over CY2018-2022. Reagent grade however has not shown any growth for the same period. The pharma grade phosphates

are expected to demonstrate a CAGR of 5.9%, reagent grade 3.8% and nutraceutical grade 5.6% in volume terms, over CY2022-2025.

Table 22: Break-up of Indian Phosphate Industry Volume by Grade (In Thousand Tonnes)

| Grades | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023F | CY2024F | CY2025F | CAGR | |
|----------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|
| | | | | | | | | | CY2018-22 | CY2022-25F |
| Pharma Grade | 759 | 785 | 874 | 890 | 868 | 942 | 992 | 1030 | 3.4% | 5.9% |
| IP | 200 | 206 | 230 | 233 | 229 | 247 | 261 | 270 | 3.4% | 5.6% |
| BP | 80 | 83 | 92 | 94 | 92 | 100 | 106 | 110 | 3.6% | 6.1% |
| EP | 163 | 168 | 186 | 188 | 183 | 197 | 207 | 214 | 2.9% | 5.4% |
| USP | 240 | 248 | 275 | 279 | 271 | 294 | 308 | 319 | 3.1% | 5.6% |
| JP | 76 | 81 | 91 | 95 | 94 | 104 | 110 | 117 | 5.5% | 7.6% |
| Reagent Grade | 278 | 285 | 291 | 291 | 278 | 296 | 305 | 311 | 0.0% | 3.8% |
| R | 165 | 169 | 173 | 172 | 165 | 175 | 181 | 184 | 0.0% | 3.7% |
| AR | 64 | 66 | 67 | 67 | 64 | 68 | 70 | 72 | 0.0% | 4.0% |
| GR | 28 | 29 | 29 | 29 | 28 | 30 | 31 | 32 | 0.0% | 4.6% |
| ACS | 21 | 22 | 22 | 22 | 21 | 22 | 23 | 24 | 0.0% | 4.6% |
| Nutraceutical Grade (FCC) | 5431 | 5658 | 5951 | 6049 | 5891 | 6378 | 6701 | 6946 | 2.1% | 5.6% |
| Others | 8771 | 9124 | 9635 | 9751 | 9456 | 10195 | 10664 | 11006 | 1.9% | 5.2% |
| Total | 15239 | 15852 | 16751 | 16981 | 16494 | 17811 | 18662 | 19292 | 2.0% | 5.4% |

Source: Maia Research, CAREEDGE Research

Note: F: Forecast

The pharma grade phosphate has projected a CAGR of 19.5%, reagent grade 15.6% and nutraceutical grade 17.9% in value terms, over CY2018-2022. The market for all these grades is expected to see a decline in value terms over CY2022-25 due to pricing correction.

Table 23: Break-up of Indian Phosphate Industry Value by Grade (USD Billion)

| Grades | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023F | CY2024F | CY2025F | CAGR | |
|----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|
| | | | | | | | | | CY2018-22 | CY2022-25F |
| Pharma Grade | 0.27 | 0.27 | 0.29 | 0.41 | 0.55 | 0.51 | 0.53 | 0.55 | 19.5% | 0.0% |
| IP | 0.06 | 0.06 | 0.07 | 0.10 | 0.13 | 0.12 | 0.12 | 0.13 | 19.5% | -0.1% |
| BP | 0.03 | 0.03 | 0.03 | 0.05 | 0.06 | 0.06 | 0.06 | 0.06 | 19.9% | 0.3% |
| EP | 0.06 | 0.06 | 0.06 | 0.09 | 0.12 | 0.11 | 0.11 | 0.12 | 19.0% | -0.4% |
| USP | 0.09 | 0.09 | 0.10 | 0.14 | 0.18 | 0.17 | 0.17 | 0.18 | 19.1% | -0.3% |
| JP | 0.03 | 0.03 | 0.03 | 0.05 | 0.06 | 0.06 | 0.06 | 0.07 | 21.6% | 1.7% |
| Reagent Grade | 0.10 | 0.09 | 0.09 | 0.13 | 0.17 | 0.16 | 0.16 | 0.16 | 15.6% | -2.0% |
| R | 0.05 | 0.05 | 0.05 | 0.07 | 0.10 | 0.09 | 0.09 | 0.09 | 15.6% | -2.1% |
| AR | 0.02 | 0.02 | 0.02 | 0.03 | 0.04 | 0.04 | 0.04 | 0.04 | 15.7% | -1.9% |
| GR | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 | 0.02 | 16.0% | -1.7% |
| ACS | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 | 0.02 | 15.4% | -2.1% |
| Nutraceutical Grade (FCC) | 1.59 | 1.58 | 1.61 | 2.31 | 3.08 | 2.84 | 2.92 | 3.06 | 17.9% | -0.2% |
| Others | 2.51 | 2.49 | 2.54 | 3.63 | 4.81 | 4.42 | 4.53 | 4.72 | 17.7% | -0.6% |
| Total | 4.46 | 4.43 | 4.53 | 6.48 | 8.62 | 7.92 | 8.13 | 8.50 | 17.9% | -0.5% |

Source: Maia Research, CAREEDGE Research

Note: F: Forecast

6. Global Acetate Industry

6.1 Overview

Acetate is a salt or ester of acetic acid. It is a versatile compound with a wide range of uses in many different industries. An acetate is a salt formed by the combination of acetic acid with a base. Acetates are used as food additives to preserve food, adjust acidity, and enhance flavour. Also, they are used in a variety of cosmetic products, such as nail polish removers, hairsprays, and deodorants.

Table 24: Different types of Acetate

| Types | Description |
|--------------------------|--|
| Sodium Acetate | Sodium acetate is used as an additive in concrete manufacturing, heating pads, buffer solutions, and the food industry. Medically, sodium acetate is an important component as an electrolyte replenisher when given intravenously. It is an indicator of correct sodium levels in hyponatremic patients. |
| Potassium Acetate | Potassium acetate is a potassium salt comprising equal numbers of potassium and acetate ions. Potassium acetate acts as an antioxidant and is used as a preservative in the food industry. It is employed in the treatment of diabetics and the production of penicillin as an antibiotic, oral cleanser, and enzymes in the pharmaceutical sector. Moreover, it is used to replenish electrolytes, for restoring water-electrolyte balance and as a urinary and systemic alkalizer. |
| Calcium Acetate | Calcium acetate is used as an analytical reagent. It is used to prepare acetic acid and acetone, food stabilizers, nutritional fortifiers, pH adjusters, integrators, fungistatic agents, buffers, preservatives, etc. |
| Zinc Acetate | Zinc acetate is available in anhydrous and dihydrate forms. Both are white crystalline solids. It is used as a plating inhibitor on main water pipes in commercial nuclear power plants. |
| Others | The others category includes manganese acetate and ammonium acetate, among others. Manganese acetate is used in textile dyeing, fertilizers, food packaging, feed additives, and in manufacturing paints and varnishes. Ammonium Acetate is a white, crystalline (sand-like) solid with a slight vinegar-like odour. It is used in chemical analysis, textile dyeing, and preserving meats. It is used as a mild expectorant, diaphoretic, and diuretic. |

Source: CAREEDGE Research

Table 25: Different Applications of Acetate

| Applications | Description |
|-----------------------|---|
| Nutraceutical | Numerous dietary supplements include acetates. This is because of its health advantages which include their capacity to strengthen the immune system, lower inflammation, and enhance cardiovascular health. |
| Reagent | Analytical chemistry often uses acetates as buffers as buffers are pH-resistant solutions and they are ideal for use in processes where a steady pH is needed. Acetates are also useful in chromatography as ion-pairing reagents. In chromatographic systems, ion-pairing chemicals are employed to enhance the separation of charged molecules. |
| Pharmaceutical | Pharmaceutical acetates are used in applications like insulin, dialysis fluids and phosphate binders, and to produce antibiotics and APIs. |
| Food | In the food industry, acetates are used in dietary ingredients as an acidity regulator (pH control agent), preservative, or sequestering agent. |
| Chemical | Acetate is a chemical raw material used as an industrial catalyst, additive, antifreeze, pH regulator, etc. It is widely used in printing and dyeing, freezing liquid, chemical reagents, water treatment and other industries. Acetate is also used as a solvent in paints, inks, and coatings. |

| Applications | Description |
|----------------------|--|
| Agriculture | Acetate has active applications in agriculture. For example, calcium acetate is recognized as a biopesticide. Whereas ammonium acetate helps balance phosphorus and ammonium in the soil. |
| Biotech | Acetates are generally used as a buffer in various biotechnological applications, such as DNA and RNA extraction and purification. They are also utilized as a solvent in some biotechnological processes, especially in the extraction of biomolecules. |
| Personal Care | It is used in some nail polish removers and nail care products due to its solvent properties. Some Acetates are also used as fragrance ingredients in personal care products. |

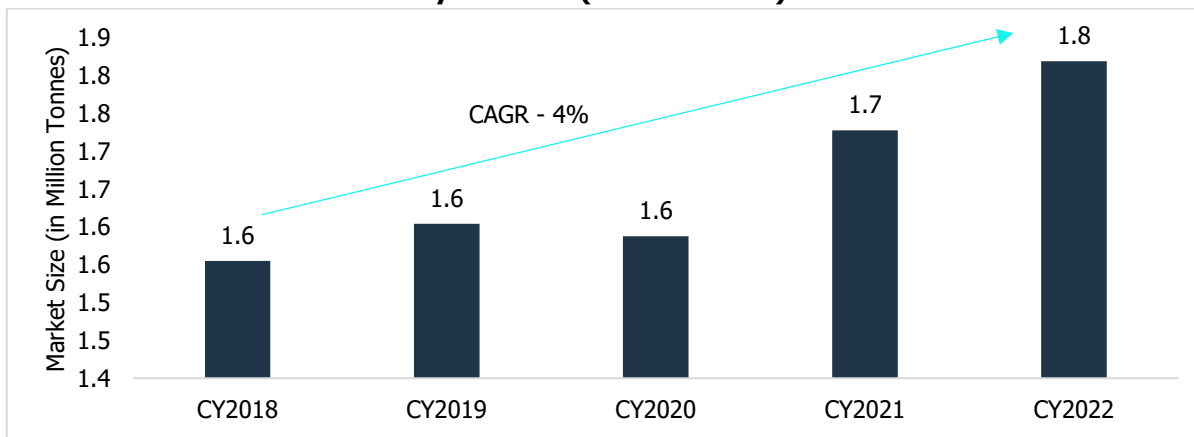
Source: CAREEDGE Research

6.2 Global Acetate Industry - Market Size

6.2.1 Volume

Global acetate industry volumes grew at a CAGR of 4% from 1.6 million tonnes in CY2018 to 1.8 million tonnes in CY2022.

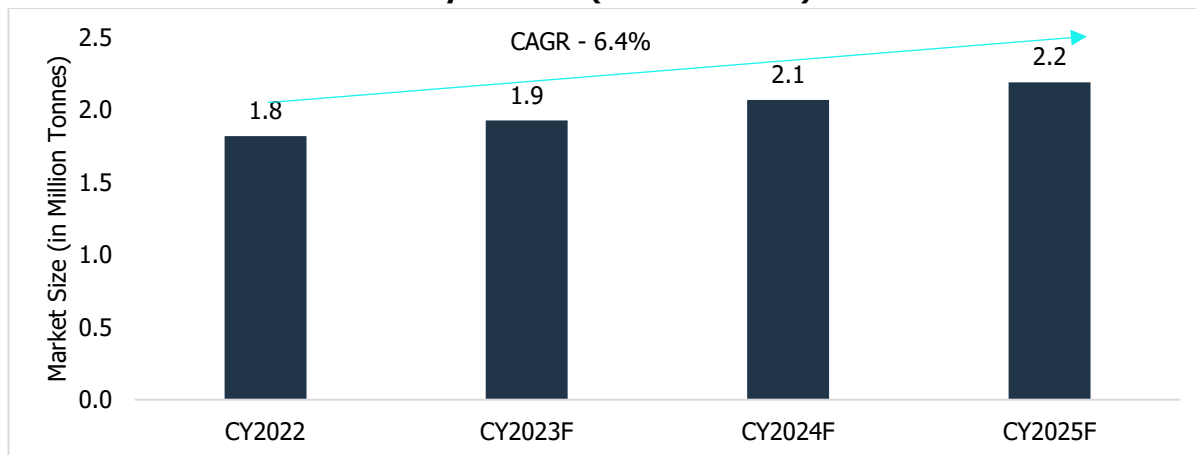
Chart 52: Global Acetate Industry Volumes (CY2018-2022)



Source: Maia Research, CAREEDGE Research

Global acetate industry volumes are expected to grow from 1.8 million tonnes in CY2022 to 2.2 million tonnes in CY2025, at a CAGR of 6.4%.

Chart 53: Global Acetate Industry Volumes (CY2022-2025F)



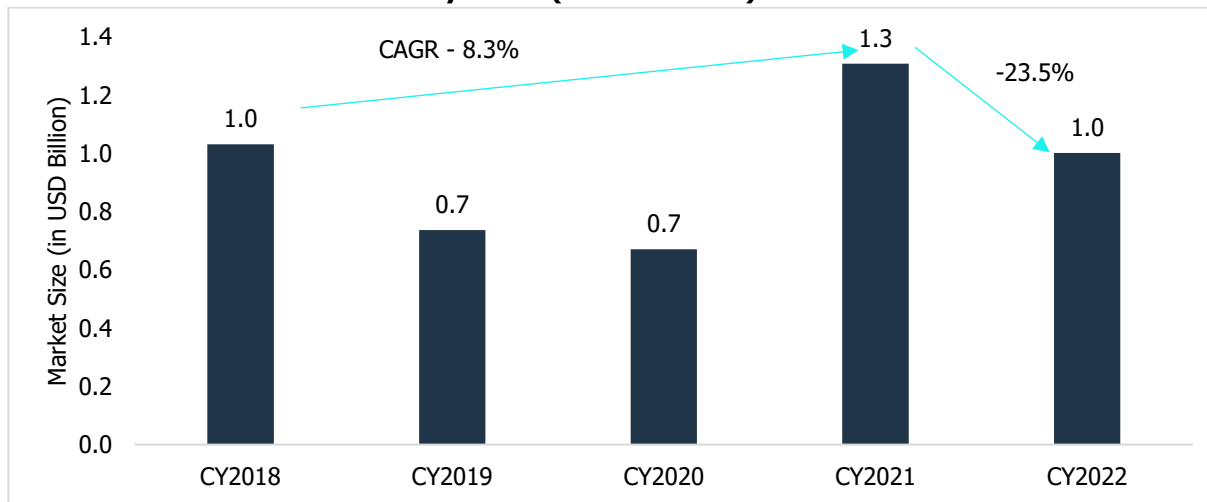
Source: Maia Research, CAREEDGE Research

Note: F - Forecast

6.2.2 Value

The Global acetate industry grew from USD 1 billion in CY2018 to USD 1.3 billion in CY2021, implying a CAGR of 8.3%. There was a y-o-y decline of around 23.5% in CY2022 in the global acetate market size on account of decline in acetate prices.

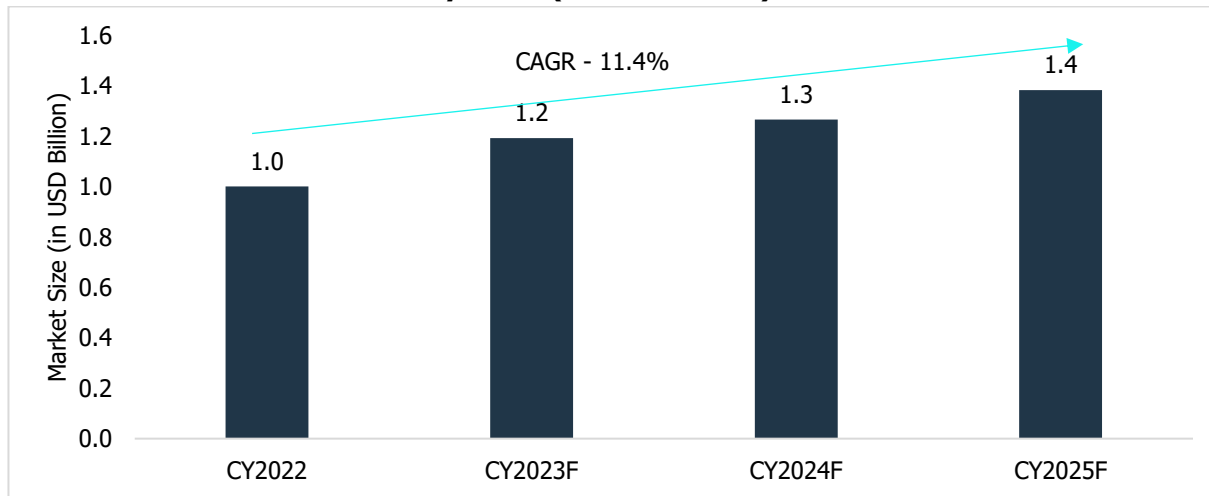
Chart 54: Global Acetate Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The acetate industry is expected to grow at a CAGR of 11.4% over the period CY2022-CY2025 to achieve market size of USD 1.4 billion by CY2025, driven by a combination of volume and pricing growth.

Chart 55: Global Acetate Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F – Forecast

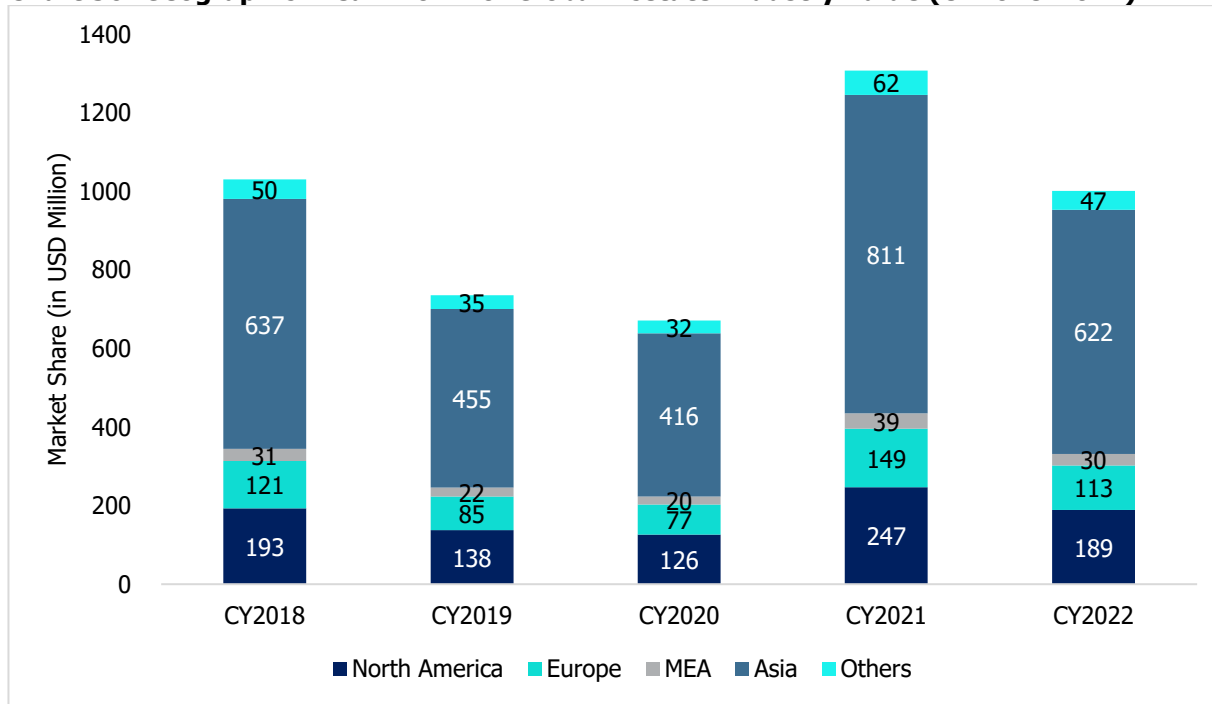
6.3 Break-Up of Global Acetate Industry Value by Geography

Asia is the largest market for acetates, accounting for 62% of global demand in CY2022. The acetate market in Asia has grown at a CAGR of 8.4% between CY2018 and CY2021, however, it declined by ~23% y-o-y in CY2022.

North America is the second-largest market for acetates, accounting for 19% of global demand in CY2022. The acetate consumption value in North America has grown at a CAGR of 8.5% between CY2018 and CY2021, however, it declined by ~23% y-o-y in CY2022.

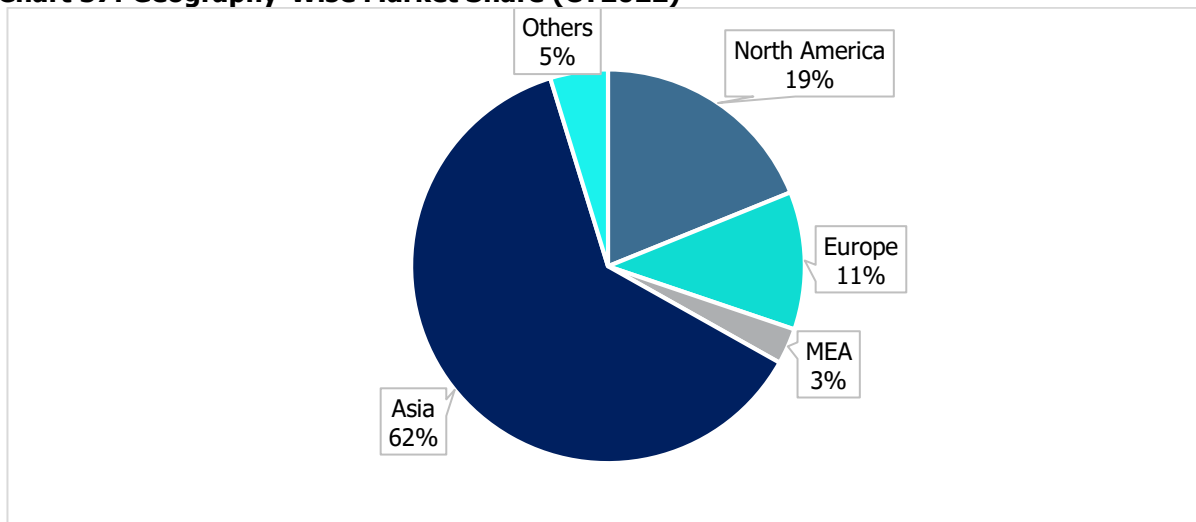
Europe is the third-largest market for acetates, accounting for around 11% of global demand in CY2022. The acetate market in Europe has grown at a CAGR of 7.4% between CY2018 and CY2021, however, it declined by ~23% y-o-y in CY2022.

Chart 56: Geographic Break-Down of Global Acetate Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

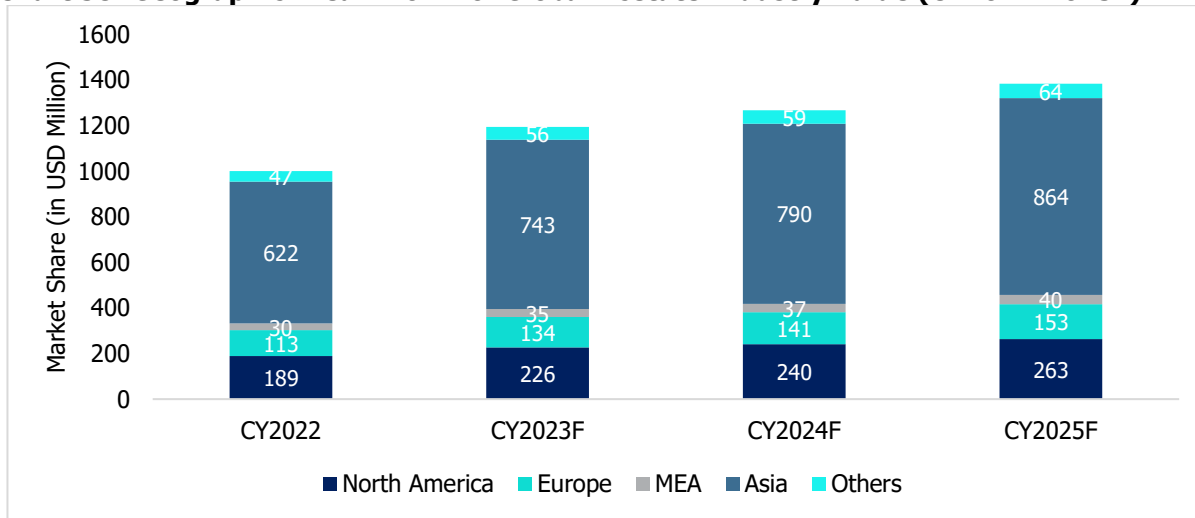
Chart 57: Geography-Wise Market Share (CY2022)



Source: Maia Research, CAREEDGE Research

Asia is expected to remain the largest-consuming market for acetates with an expected share of 62% in global acetate market in CY2025.

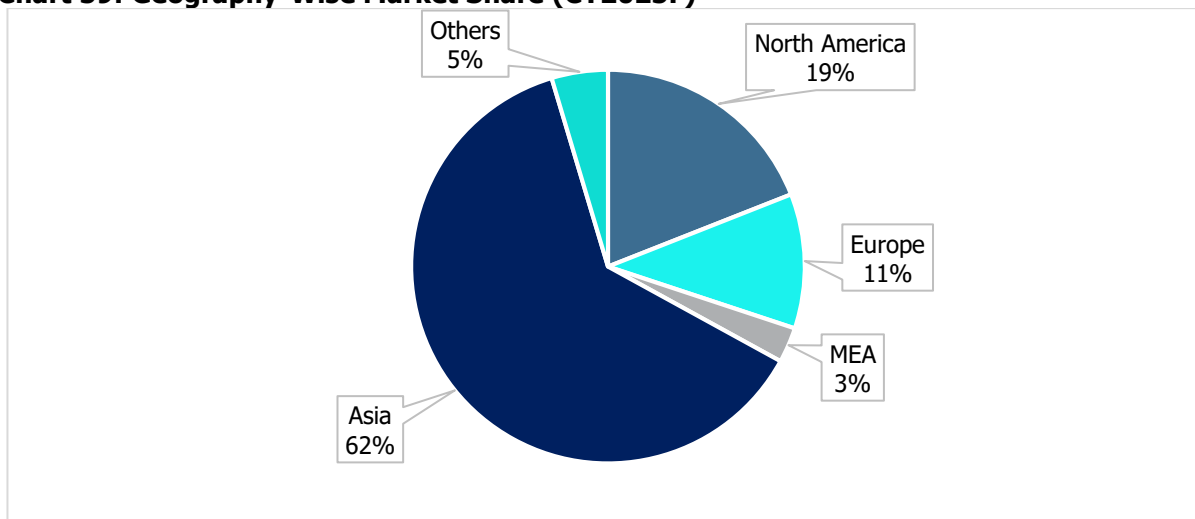
Chart 58: Geographic Break-Down of Global Acetate Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F - Forecast

Chart 59: Geography-Wise Market Share (CY2025F)



Source: Maia Research, CAREEDGE Research

6.4 Break-Up of Global Acetate Industry by Grade

The pharma grade acetates have demonstrated a CAGR of 16.1%, reagent grade 10.8% and nutraceutical grade 3.1% in volume terms, over CY2018-2022. The pharma grade acetates are expected to demonstrate a CAGR of 7.1%, reagent grade 5.3% and nutraceutical grade 6.6% in volume terms, over CY2022-2025.

Table 26: Break-Up of Global Acetate Industry Volume by Grade (in Thousand Tonnes)

| Grades | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023 F | CY2024 F | CY2025 F | CAGR | |
|----------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|
| | | | | | | | | | CY2018-22 | CY2022-25F |
| Pharma Grade | 110 | 167 | 173 | 189 | 200 | 213 | 230 | 246 | 16.1% | 7.1% |
| IP | 18 | 25 | 26 | 26 | 27 | 27 | 29 | 29 | 11.9% | 1.9% |
| BP | 11 | 18 | 18 | 20 | 21 | 23 | 25 | 27 | 16.8% | 8.0% |
| EP | 30 | 46 | 47 | 53 | 56 | 60 | 65 | 70 | 16.8% | 8.1% |
| USP | 33 | 51 | 53 | 58 | 62 | 66 | 71 | 76 | 17.1% | 7.3% |
| JP | 19 | 28 | 29 | 32 | 34 | 37 | 41 | 44 | 16.3% | 8.3% |
| Reagent Grade | 62 | 81 | 83 | 89 | 93 | 98 | 104 | 109 | 10.8% | 5.3% |
| R | 30 | 36 | 37 | 37 | 39 | 37 | 40 | 39 | 6.5% | 0.0% |
| AR | 12 | 15 | 15 | 16 | 17 | 17 | 18 | 19 | 9.8% | 4.2% |
| GR | 9 | 12 | 12 | 14 | 14 | 16 | 16 | 18 | 13.3% | 8.9% |
| ACS | 12 | 18 | 19 | 23 | 24 | 28 | 29 | 33 | 18.8% | 11.8% |
| Nutraceutical Grade (FCC) | 529 | 526 | 519 | 566 | 598 | 634 | 683 | 725 | 3.1% | 6.6% |
| Others | 854 | 830 | 813 | 884 | 928 | 981 | 1,051 | 1,111 | 2.1% | 6.2% |
| Total | 1,555 | 1,604 | 1,588 | 1,728 | 1,819 | 1,926 | 2,068 | 2,190 | 4.0% | 6.4% |

Source: Maia Research, CAREEDGE Research

F - Forecasted

Pharma grade, reagent grade, and nutraceutical grade acetate consumption grew at a CAGR of 7.5%, 6.4%, and 6.2%, respectively, between CY2018 and CY2021. However, due to price correction, the global market size for these grades declined by 30%, 24%, and 23%, respectively, on a y-o-y basis in CY2022.

Pharma grade, reagent grade, and nutraceutical grade consumption is expected to increase at a CAGR of 12.1%, 10.3%, and 11.7%, respectively, during CY2022-CY2025.

Table 27: Break-Up of Global Acetate Industry Value by Grade (in USD Million)

| Grades | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023 F | CY2024 F | CY2025 F | CAGR | |
|----------------------------------|---------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|-------------|--------------|
| | | | | | | | | | CY2018-21 | CY2022-25F |
| Pharma Grade | 106.9 | 76.7 | 72.9 | 143.0 | 110.2 | 132.2 | 141.2 | 155.2 | 7.5% | 12.1% |
| IP | 15.7 | 11.3 | 10.8 | 21.2 | 16.4 | 19.7 | 21.1 | 23.2 | 7.8% | 12.4% |
| BP | 11.3 | 8.1 | 7.6 | 14.9 | 11.4 | 13.6 | 14.4 | 15.8 | 7.1% | 11.5% |
| EP | 29.3 | 21.1 | 20.0 | 39.2 | 30.2 | 36.2 | 38.6 | 42.6 | 7.6% | 12.2% |
| USP | 32.8 | 23.5 | 22.3 | 43.9 | 33.9 | 40.7 | 43.6 | 48.0 | 7.6% | 12.3% |
| JP | 17.9 | 12.8 | 12.2 | 23.8 | 18.4 | 22.0 | 23.5 | 25.7 | 7.5% | 11.8% |
| Reagent Grade | 52.8 | 37.3 | 35.1 | 67.7 | 51.3 | 60.5 | 63.6 | 68.8 | 6.4% | 10.3% |
| R | 23.6 | 16.6 | 15.7 | 30.3 | 23.0 | 27.2 | 28.6 | 31.0 | 6.5% | 10.4% |
| AR | 9.7 | 6.8 | 6.4 | 12.3 | 9.3 | 11.0 | 11.5 | 12.4 | 6.2% | 10.0% |
| GR | 7.6 | 5.4 | 5.0 | 9.7 | 7.3 | 8.6 | 9.0 | 9.8 | 6.2% | 10.0% |
| ACS | 12.0 | 8.5 | 8.0 | 15.4 | 11.7 | 13.8 | 14.5 | 15.7 | 6.5% | 10.4% |
| Nutraceutical Grade (FCC) | 336.7 | 241.2 | 219.4 | 428.7 | 329.0 | 393.2 | 418.4 | 458.1 | 6.2% | 11.7% |
| Others | 534.8 | 381.0 | 343.8 | 668.8 | 511.0 | 608.1 | 644.4 | 702.4 | 5.8% | 11.2% |
| Total | 1031.2 | 736.2 | 671.2 | 1308.2 | 1001.4 | 1194.0 | 1267.7 | 1384.6 | 6.1% | 11.4% |

Source: Maia Research, CAREEDGE Research

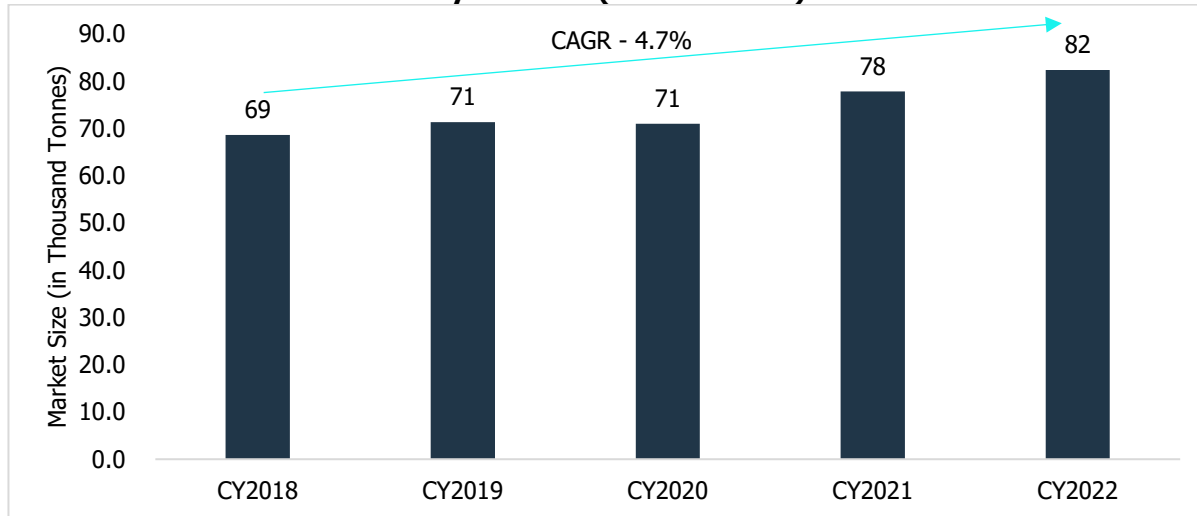
F - Forecasted

6.5 Indian Acetate Industry

6.5.1 Volume

The Indian acetate industry volumes grew at a CAGR of 4.7% from 69 thousand tonnes in CY2018 to 82 thousand tonnes in CY2022.

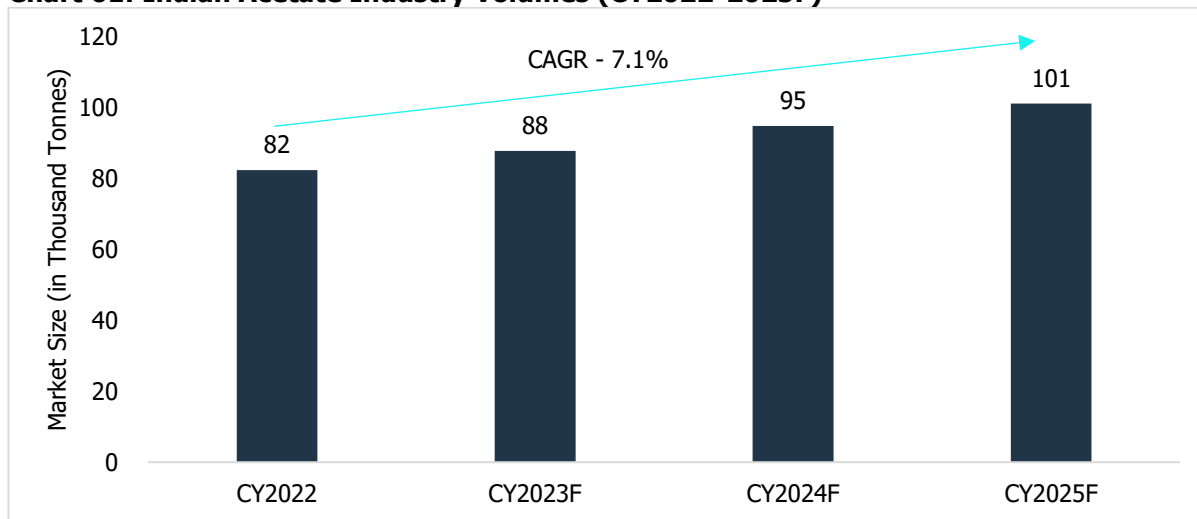
Chart 60: Indian Acetate Industry Volumes (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The Indian acetate industry volumes are expected to grow from 82 thousand tonnes in CY2022 to 101 thousand tonnes in CY2025, projecting a CAGR of 7.1%.

Chart 61: Indian Acetate Industry Volumes (CY2022-2025F)



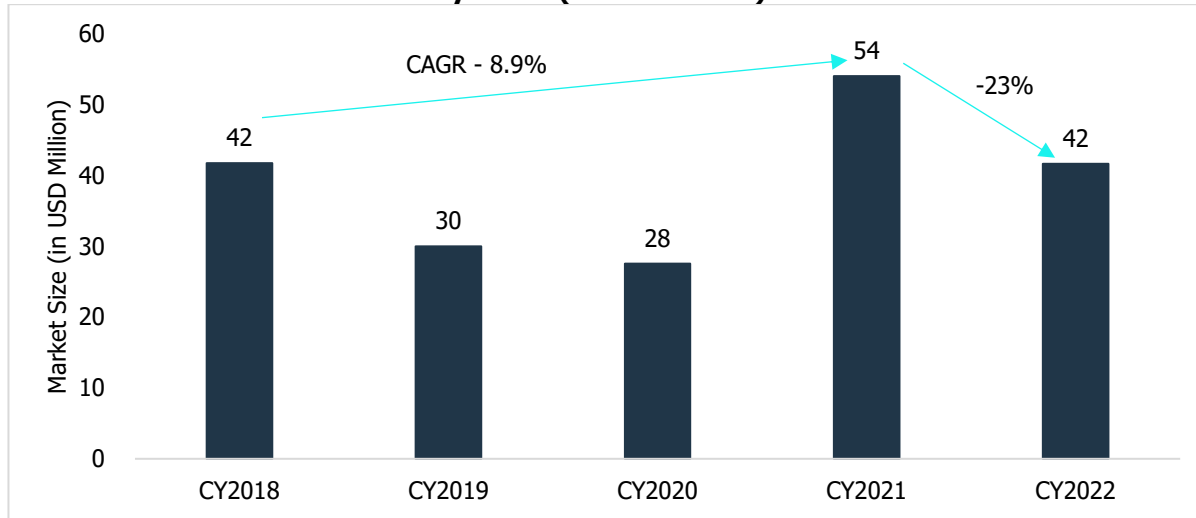
Source: Maia Research, CAREEDGE Research

F - Forecasted

6.5.2 Value

The Indian acetate industry grew from USD 42 million in CY2018 to USD 54 billion in CY2021, implying a CAGR of 8.9%. There was a y-o-y decline of 23% in the industry size in CY2022 due to a correction in acetate prices.

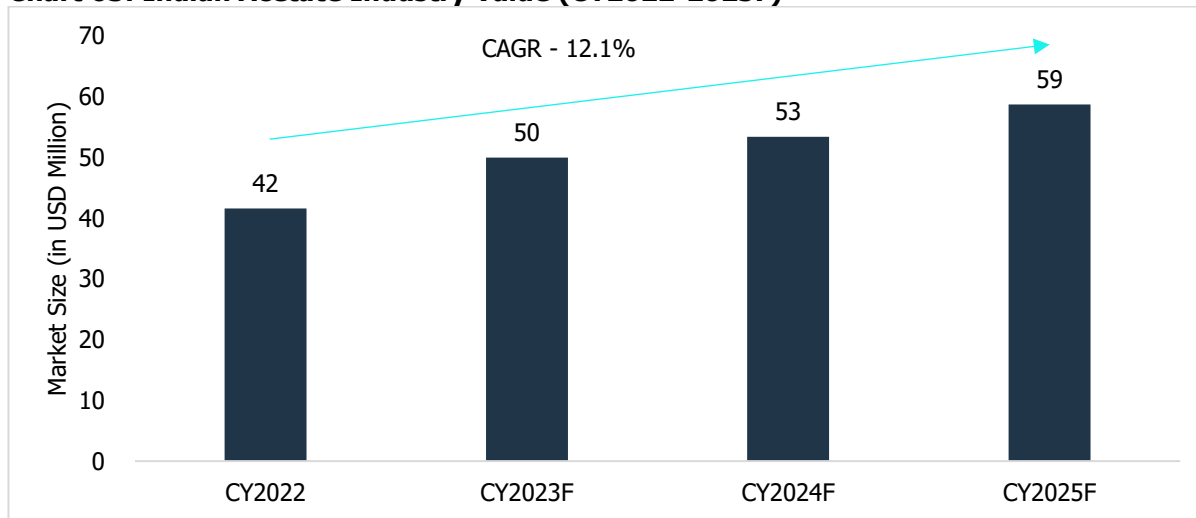
Chart 62: Indian Acetate Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The Indian acetate industry is expected to grow from USD 42 million in CY2022 to USD 59 million in CY2025, projecting a CAGR of 12.1%, driven by a combination of volume and pricing growth.

Chart 63: Indian Acetate Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

F - Forecasted

6.5.3 Break-Up of Indian Acetate Industry by Grade

The Indian acetate market for pharma, reagent, and nutraceutical grades grew at a CAGR of 6%, 4.9%, and 4.5%, respectively, in volume terms between CY2018 and CY2021. Further, the Indian acetate consumption volumes for pharma, reagent, and nutraceutical grades is expected to grow at a CAGR of 7.5%, 6.1% and 7.3%, respectively, between CY2022 and CY2025.

Table 28: Break-Up of Indian Acetate Industry Volume by Grade (in USD Million)

| Breakup by grade | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023 (E) | CY2024 (F) | CY2025 (F) | CAGR | |
|-----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|-------------|
| | | | | | | | | | (CY18-CY21) | (CY22-CY25) |
| Pharma Grade | 5.8 | 6.0 | 6.3 | 6.9 | 7.4 | 7.9 | 8.6 | 9.2 | 6.0% | 7.5% |
| IP | 0.8 | 0.9 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 7.7% | 8.4% |
| BP | 0.6 | 0.7 | 0.7 | 0.8 | 0.8 | 0.9 | 0.9 | 1.0 | 10.1% | 7.7% |
| EP | 1.4 | 1.5 | 1.5 | 1.7 | 1.8 | 1.9 | 2.1 | 2.2 | 6.7% | 6.9% |
| USP | 1.7 | 1.8 | 1.9 | 2.1 | 2.2 | 2.4 | 2.6 | 2.8 | 7.3% | 8.4% |
| JP | 1.2 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 | 1.7 | 1.8 | 5.3% | 6.3% |
| Reagent Grade | 2.6 | 2.7 | 2.7 | 3.0 | 3.1 | 3.3 | 3.5 | 3.7 | 4.9% | 6.1% |
| R | 1.4 | 1.4 | 1.5 | 1.6 | 1.7 | 1.8 | 1.9 | 2.0 | 4.6% | 5.6% |
| AR | 0.7 | 0.7 | 0.7 | 0.8 | 0.8 | 0.8 | 0.9 | 0.9 | 4.6% | 4.0% |
| GR | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.0% | 0.0% |
| ACS | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 14.5% | 0.0% |
| Nutraceuticals Grade (FCC) | 21.3 | 22.2 | 22.1 | 24.3 | 25.8 | 27.5 | 29.8 | 31.9 | 4.5% | 7.3% |
| Others | 38.9 | 40.3 | 39.9 | 43.6 | 46.2 | 49.1 | 53.0 | 56.4 | 3.9% | 6.9% |
| Total | 68.6 | 71.3 | 71.0 | 77.8 | 82.4 | 87.8 | 94.9 | 101.2 | 4.3% | 7.1% |

The Indian acetate market for pharma, reagent, and nutraceutical grades grew at a CAGR of 11%, 9.4%, and 9.1%, respectively, in volume terms between CY2018 and CY2021. However, the consumption value of these grades declined by 23%, 24%, and 23%, respectively on a y-o-y basis in CY2022.

Further, the Indian acetate market for pharma, reagent, and nutraceutical grades is expected to grow at a CAGR of 12.9%, 11% and 12.5%, respectively, between CY2022 and CY2025.

Table 29: Break-Up of Indian Acetate Industry Value by Grade (in USD Million)

| Grades | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023 F | CY2024 F | CY2025 F | CAGR | |
|----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|
| | | | | | | | | | CY2018-21 | CY2022-25F |
| Pharma Grade | 4.6 | 3.3 | 3.2 | 6.3 | 4.9 | 5.9 | 6.4 | 7.0 | 11.0% | 12.9% |
| IP | 0.6 | 0.4 | 0.4 | 0.8 | 0.7 | 0.8 | 0.9 | 1.0 | 11.3% | 12.9% |
| BP | 0.5 | 0.4 | 0.4 | 0.7 | 0.5 | 0.7 | 0.7 | 0.8 | 10.4% | 12.6% |
| EP | 1.1 | 0.8 | 0.8 | 1.6 | 1.2 | 1.5 | 1.6 | 1.7 | 10.8% | 13.0% |
| USP | 1.4 | 1.0 | 1.0 | 2.0 | 1.5 | 1.8 | 2.0 | 2.2 | 10.9% | 13.2% |
| JP | 0.9 | 0.7 | 0.6 | 1.3 | 1.0 | 1.2 | 1.3 | 1.4 | 11.1% | 12.6% |
| Reagent Grade | 1.9 | 1.3 | 1.3 | 2.4 | 1.9 | 2.2 | 2.3 | 2.5 | 9.4% | 11.0% |
| R | 0.9 | 0.7 | 0.6 | 1.2 | 0.9 | 1.1 | 1.2 | 1.3 | 9.5% | 11.2% |
| AR | 0.5 | 0.3 | 0.3 | 0.6 | 0.5 | 0.6 | 0.6 | 0.6 | 8.9% | 10.8% |
| GR | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 10.1% | 11.2% |
| ACS | 0.2 | 0.1 | 0.1 | 0.3 | 0.2 | 0.2 | 0.3 | 0.3 | 9.1% | 11.9% |
| Nutraceutical Grade (FCC) | 12.8 | 9.2 | 8.4 | 16.6 | 12.8 | 15.4 | 16.5 | 18.2 | 9.1% | 12.4% |
| Others | 22.5 | 16.1 | 14.6 | 28.7 | 22.0 | 26.4 | 28.2 | 30.9 | 8.5% | 11.9% |
| Total | 41.7 | 30.0 | 27.5 | 54.0 | 41.6 | 49.9 | 53.4 | 58.7 | 9.0% | 12.1% |

Source: Maia Research, CAREEDGE Research

F – Forecasted

7. Global Sulphate Industry

7.1 Overview

Sulphates are inorganic ions found in nature and synthesized for industry. In the natural world, they occur as aerosols from biomass combustion and as part of the sulphur cycle of some microorganisms.

Sulphates are also the salts and esters of sulphuric acid, a highly corrosive acid. These compounds are valuable in many industries because they are excellent detergents, emulsifiers, and foaming agents.

Table 30: Types of Sulphate

| Types | Description |
|---------------------------|---|
| Sodium Sulphate | <p>Sodium sulphate is a salt formed by the combination of sulphate radicals and sodium ions. Sodium sulphate is soluble in water and its solution is mostly neutral. It is soluble in glycerin but not in ethanol.</p> <p>Sodium sulphate is used in the manufacture of glass, enamel, paper pulp, refrigeration mixtures, detergents, desiccants, dye diluents, analytical chemical reagents, feed, tanning, oil & gas pipeline anticorrosion, metal smelting, surface treatment, fillers, and other industries.</p> |
| Potassium Sulphate | <p>Potassium sulphate is a commonly used potassium fertilizer in agriculture, with a potassium content of about 50%. Potassium sulphate can be used as base fertilizer and top dressing. It is suitable for alkaline soil, especially for crops that avoid chlorine (such as tobacco and grapes). In addition, potassium sulphate is also used in glass, dyes, spices, medicine and other industries.</p> |
| Calcium Sulphate | <p>Calcium sulphate is mainly used as polishing powder, paint white pigment, paper filler, gas desiccant, etc. Calcium sulphate dihydrate is mainly used to make cement, sulfuric acid, and calcium sulphate hemihydrate. It is also used to reduce soil alkalinity and improve soil properties.</p> <p>Calcium sulphate can also be used as a tofu coagulant and chemical reagent. A-type calcium sulphate hemihydrate is mainly used as high-strength gypsum components in buildings, gypsum pans, structural models, and fixed cementitious parts during mechanical processing</p> |
| Magnesium Sulphate | <p>Magnesium sulphate can be used as a filler in the tanning industry to enhance heat resistance. In the printing and dyeing industry, it is used as a weighting agent for thin cotton cloth, cotton and silk, as a filler for kapok products, as a chromogenic salt for blue dyes, and as an alkali absorbing agent in black liquor.</p> <p>Whereas in the microbial industry, it is used as a culture medium component and as a brewing additive to supplement the magnesium in brewing water and serve as a nutrient source during fermentation.</p> <p>Further, in the light industry, it can be used as a stabilizer for the production of fresh yeast, monosodium glutamate and calcium hydrogen phosphate in toothpaste production. Moreover, in the cement industry, it can be used as a coagulant. Magnesium sulphate is also used in industries such as papermaking, control, fertilizer, porcelain, pigments, feed, explosives, and fireproof materials.</p> |

| Types | Description |
|--------|--|
| Others | Others include copper sulphate and ferrous sulphate. Copper sulphate is widely used in the agriculture, feed, water treatment, electroplating, catalysts, paints, mineral processing, and other industries. Whereas ferrous sulphate can be used as a flocculant, reducing agent, dietary supplement, dye, pesticide, and soil pH regulator. |

Source: CAREEDGE Research

Table 31: Application of Sulphate

| Applications Description | Applications Description |
|-----------------------------|---|
| Agriculture | Sulphur is a highly effective and powerful nutrient for soil. Sulphate is one of the sulphur fertilizers, highly effective and well-suited for fast-growing crops. There are also some sulphates with special benefits like ferrous sulphate. It can be used as a pesticide and is more suitable for flowers and trees. |
| Industrial | Sulphate is widely used in industrial applications in glass, papermaking, textiles, dyes, non-ferrous metal smelting, leather, detergents, cement, enamel, and other industries. It can also be used to produce other chemical products such as sodium sulfide and sodium silicate. |
| Construction | Sulphates are widely used in the construction industry. For example, calcium sulphate is used as a building material to make high-strength gypsum components and gypsum boards. Barium sulfate can also be used as a radiation protection wall material. |
| Reagents | Sulphates have various applications in laboratory reagents and chemical processes due to their stability and solubility properties. Sulphates are commonly used to precipitate metal ions from solutions as insoluble sulphate salts. They are also used as drying agents, dehydrating agents, and catalysts. |
| Pharmaceutical | Sulphates, such as magnesium sulphate and sodium sulphate, are used as excipients in pharmaceutical formulations. They can serve as bulking agents, disintegrates, or drying agents in tablet and capsule formulations. Sulphates are also used as Epsom salts, intravenous fluids, antibiotics, buffering & stabilizing agents, etc. |
| Nutraceuticals | Sulphates and sulphate-containing compounds are used in mineral supplements, Sulphur-containing amino acids and other Health supplements. |
| Biotechnology | Sulphates in various forms have several applications in biotechnology like providing buffer solutions (Ammonium Sulphate) for precipitation and purification of proteins. Magnesium sulphate is also used as a cofactor in many enzyme reactions. Other biotech uses are wastewater treatment, fermentation process, and polymerase chain reaction. |
| Metallurgy | Sulphates play various roles in metallurgy, primarily as sources of sulphur, and in some cases, as fluxing agents. The applications in which sulphates are used in metallurgical processes are ore processing, flotation (separation of different metals), desulfurization (gypsum), electrorefining (copper sulphate), metal plating (nickel sulphate, zinc sulphate), lead acid batteries (lead sulphate), aluminium production (purification of bauxite ore), and hydrometallurgical process (extraction). |
| Personal Care | Sulphates particularly in the form of surfactants, are commonly used in personal care products for their cleansing and foaming properties. Sulphates used in personal care are mainly Sodium Lauryl Sulphate (SLS) and Sodium Laureth Sulphate (SLES). |
| Food & Beverages | Sulphates find applications in the food & beverage industry. Sodium sulphate is used as a caramel colouring agent and food colouring diluent. Whereas potassium sulfate is often used |

as a flavouring agent and as a dietary salt substitute. Magnesium sulfate is available as a dietary supplement and colour stabilizer.

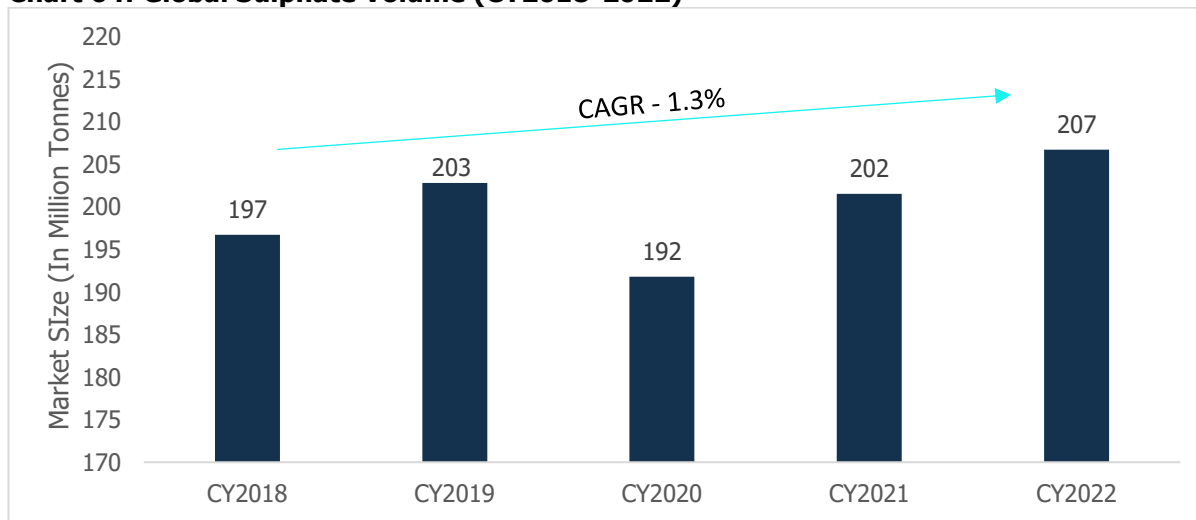
Source: CAREEDGE Research

7.2 Global Sulphate Industry – Market Size

7.2.1 Volume

The global sulphate industry grew at a CAGR of 1.3% in volume terms from 197 million tonnes in CY2018 to 207 million tonnes in CY2022.

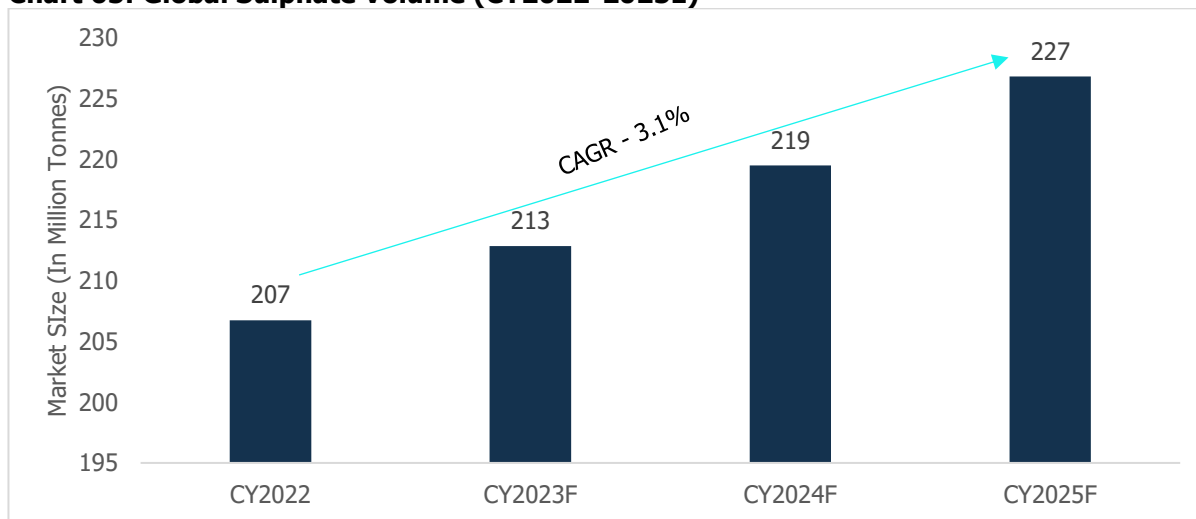
Chart 64: Global Sulphate Volume (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The global sulphate industry volumes are expected to grow from 207 million tonnes in CY2022 to 227 million tonnes in CY2025, implying a CAGR of 3.2% over this period.

Chart 65: Global Sulphate Volume (CY2022-2025E)



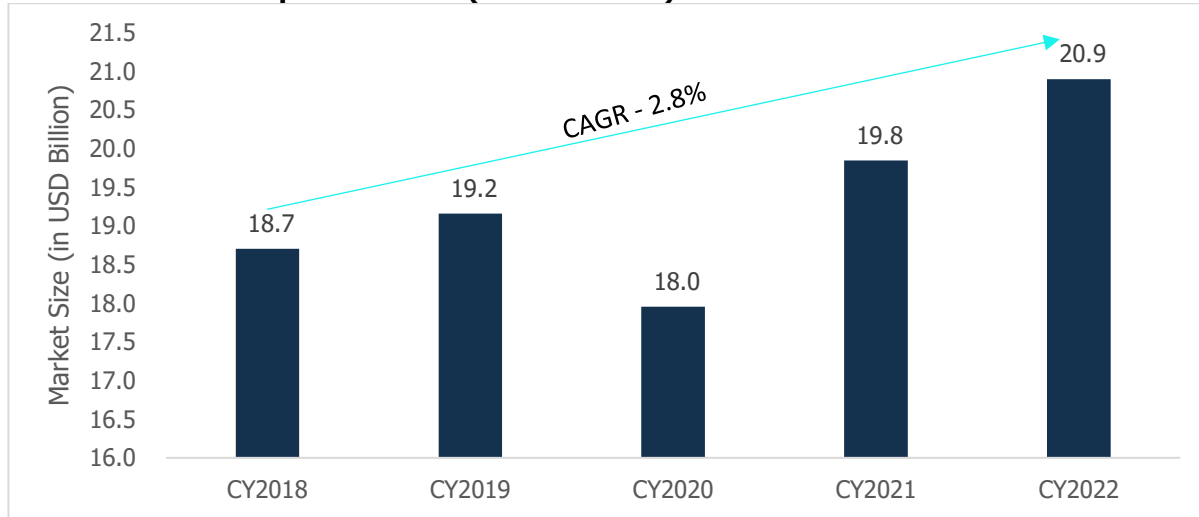
Source: Maia Research, CAREEDGE Research

F: Forecast

7.2.2 Value

The global sulphate industry grew at a CAGR of 2.8% from USD 18.7 billion in CY2018 to USD 20.9 billion in CY2022.

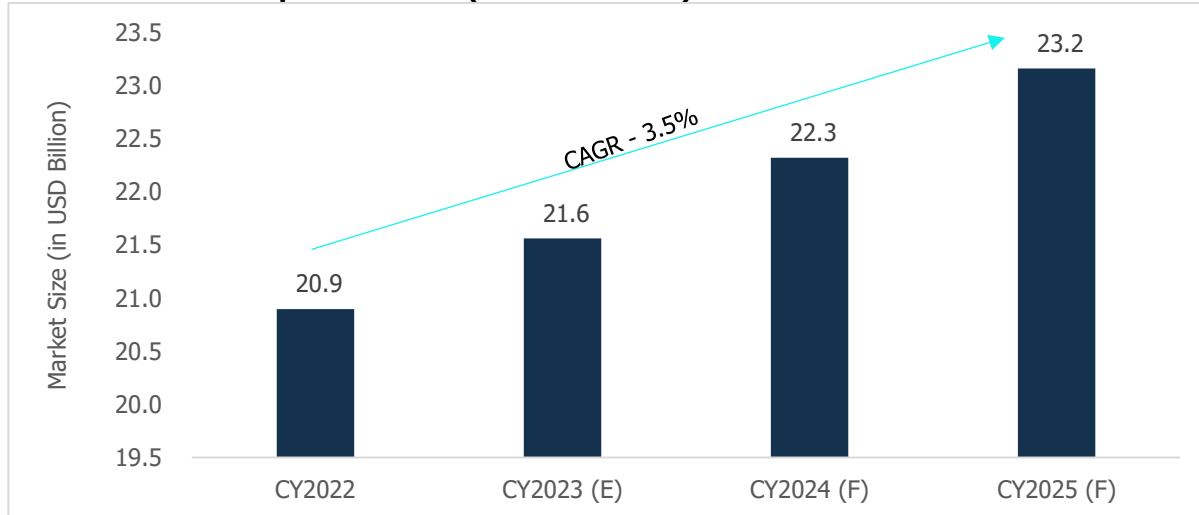
Chart 66: Global Sulphate Market (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The global sulphate industry size is expected to increase from USD 20.9 billion in CY2022 to USD 23.2 billion in CY2025, implying a CAGR of 3.5% over this period, led by increase in consumption volumes.

Chart 67: Global Sulphate Market (CY2022-2025E)



Source: Maia Research, CAREEDGE Research

Note: F: Forecast

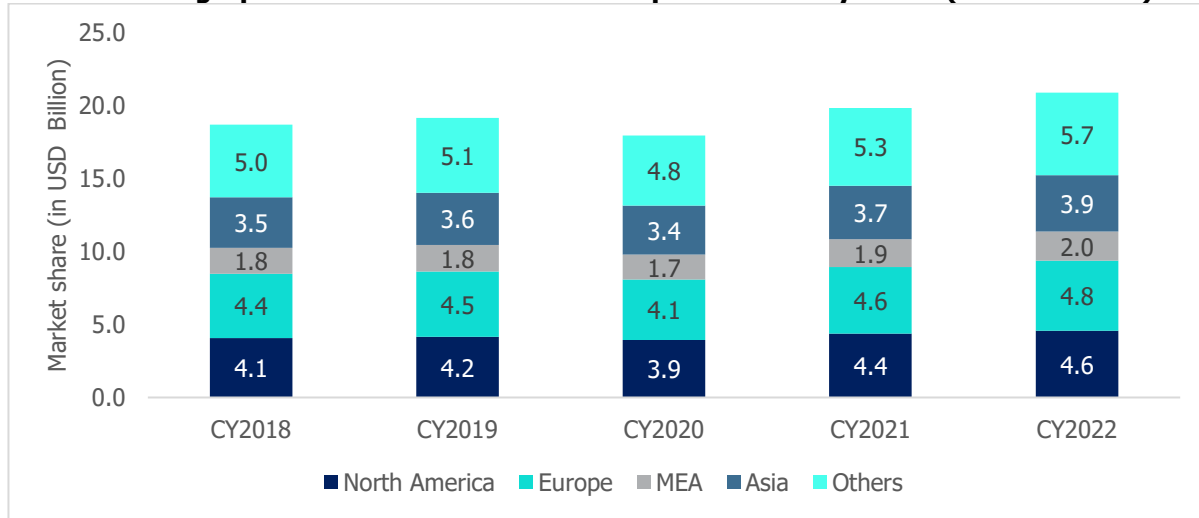
7.3 Break-Up of Global Sulphate Industry Value by Geography

Europe is the largest consumer of sulphate, accounting for over 23% of the global market share in CY2022. The region's demand witnessed a CAGR of 2.2% from CY2018 to CY2022.

Whereas North America is the second-largest consumer of sulphates, accounting for over 22% of the global market share in CY2022. The region has experienced growth at a CAGR of 2.9% from CY2018 to CY2022.

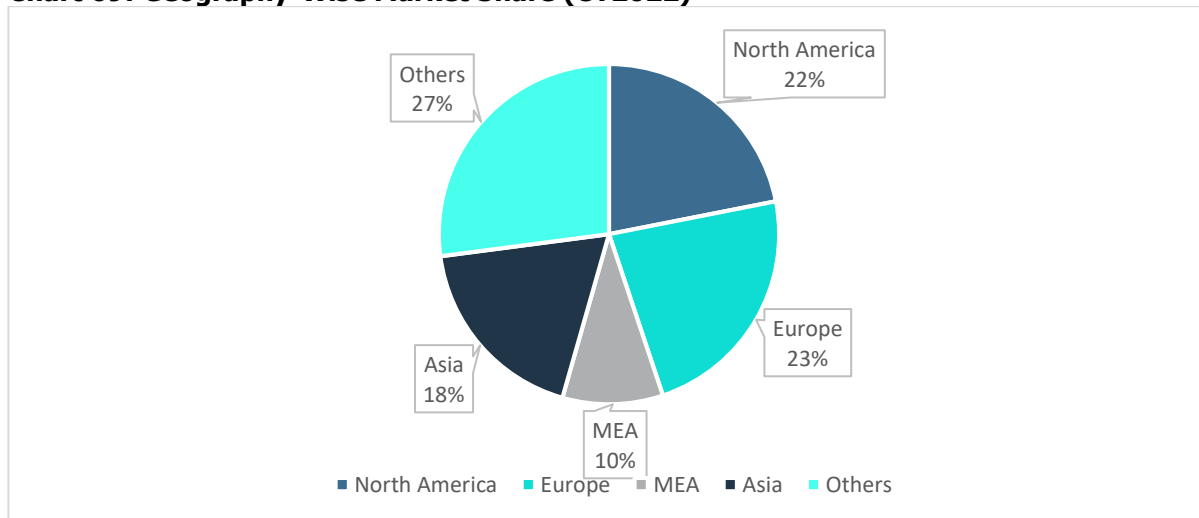
Further, Asia is the third-largest market of sulphates, accounting for 18% of the global market share in CY2022. The region’s consumption has grown at a CAGR of 2.7% from CY2018 to CY2022.

Chart 68: Geographic Break-Down of Global Sulphate Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

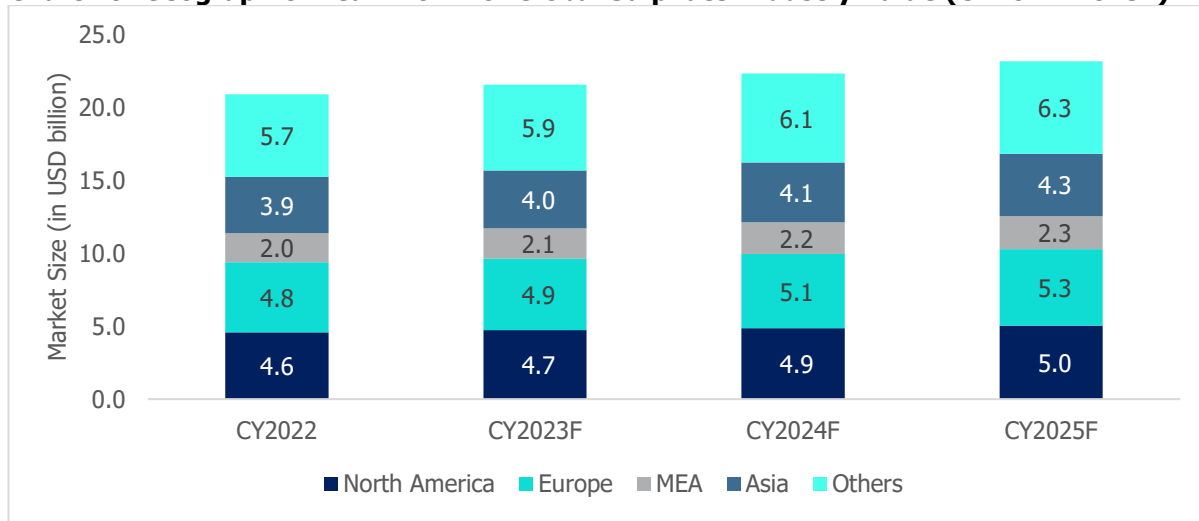
Chart 69: Geography-Wise Market Share (CY2022)



Source: Maia Research, CAREEDGE Research

Europe is expected to remain the largest market for sulphates with an expected contribution of 23% in CY2025.

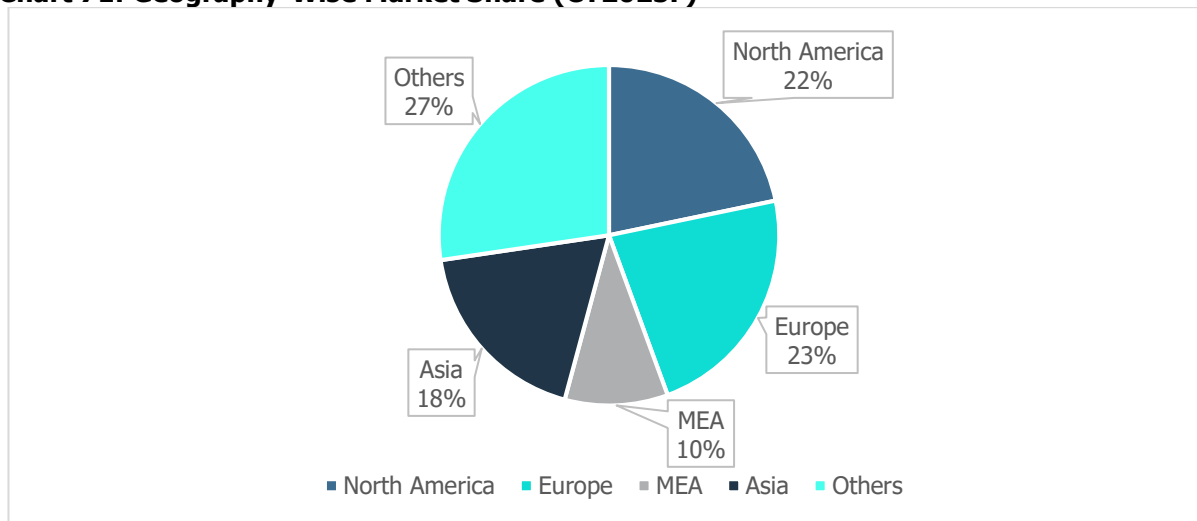
Chart 70: Geographic Break-Down of Global Sulphate Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F: Forecast

Chart 71: Geography-Wise Market Share (CY2025F)



Source: Maia Research, CAREEDGE Research

7.4 Break-Up of Global Sulphate Industry by Grade

The pharma grade sulphates have demonstrated a CAGR of 2.3%, reagent grade -1.0% and nutraceutical grade 2.0% in volume terms, over CY2018-2022. The pharma grade sulphates are expected to demonstrate a CAGR of 3.7%, reagent grade 1.5% and nutraceutical grade 3.8% in volume terms, over CY2022-2025.

Table 32: Break-Up of Global Sulphate Industry Volume by Grade (In Thousand Tonnes)

| Grade | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023F | CY2024F | CY2025F | CAGR (CY18-CY22) | CAGR (CY22-CY25) |
|-----------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|
| Pharma Grade | 1,695 | 1,712 | 1,713 | 1,806 | 1,858 | 1,922 | 1,991 | 2,073 | 2.3% | 3.7% |
| IP | 137 | 137 | 137 | 146 | 149 | 153 | 159 | 163 | 2.1% | 3.0% |
| BP | 147 | 152 | 150 | 160 | 167 | 172 | 177 | 187 | 3.2% | 3.8% |
| EP | 547 | 544 | 534 | 560 | 578 | 604 | 613 | 629 | 1.4% | 2.9% |
| USP | 711 | 719 | 728 | 760 | 773 | 795 | 835 | 873 | 2.1% | 4.1% |
| JP | 152 | 160 | 164 | 180 | 190 | 198 | 208 | 221 | 5.7% | 5.2% |
| Reagent Grade | 1,511 | 1,512 | 1,378 | 1,429 | 1,449 | 1,465 | 1,507 | 1,514 | -1.0% | 1.5% |
| R | 785 | 779 | 711 | 734 | 754 | 756 | 781 | 778 | -1.0% | 1.0% |
| AR | 316 | 317 | 287 | 296 | 297 | 302 | 310 | 314 | -1.5% | 1.9% |
| GR | 226 | 229 | 211 | 221 | 221 | 230 | 234 | 235 | -0.6% | 2.1% |
| ACS | 184 | 187 | 169 | 178 | 178 | 177 | 182 | 186 | -0.8% | 1.5% |
| Nutraceuticals Grade (FCC) | 1,501 | 1,528 | 1,466 | 1,576 | 1,627 | 1,704 | 1,774 | 1,819 | 2.0% | 3.8% |
| Others | 1,92,041 | 1,98,080 | 1,87,262 | 1,96,761 | 2,01,812 | 2,07,766 | 2,14,207 | 2,21,403 | 1.2% | 3.1% |
| Total | 1,96,749 | 2,02,833 | 1,91,820 | 2,01,571 | 2,06,745 | 2,12,858 | 2,19,479 | 2,26,809 | 1.2% | 3.1% |

Source: Maia Research, CAREEDGE Research

Note: F: Forecast

The pharma grade sulphates have witnessed a CAGR of 4.2%, reagent grade 0.9% and nutraceutical grade 2.9% in value terms, over CY2018-2022. The market for all these grades is expected to see moderate growth in value terms by 4.0%, 1.9%, and 3.7%, respectively, over CY2022-2025.

Table 33: Break-Up of Global Sulphate Industry Value by Grade (In USD Billion)

| Grade | CY18 | CY19 | CY20 | CY21 | CY22 | CY23F | CY24F | CY25F | CAGR (CY18-CY22) | CAGR (CY22-CY25) |
|-----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------------|------------------|
| Pharma Grade | 1.3 | 1.4 | 1.3 | 1.5 | 1.6 | 1.6 | 1.7 | 1.8 | 4.2% | 4.0% |
| IP | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 4.2% | 3.9% |
| BP | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 4.7% | 4.2% |
| EP | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 3.7% | 3.5% |
| USP | 0.6 | 0.6 | 0.6 | 0.6 | 0.7 | 0.7 | 0.7 | 0.7 | 4.1% | 3.8% |
| JP | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 6.1% | 5.8% |
| Reagent Grade | 1.0 | 1.0 | 0.9 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.9% | 1.9% |
| R | 0.5 | 0.5 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.8% | 1.8% |
| AR | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 1.0% | 2.0% |
| GR | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 1.1% | 2.2% |
| ACS | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.6% | 1.7% |
| Nutraceuticals Grade (FCC) | 1.0 | 1.0 | 1.0 | 1.1 | 1.1 | 1.2 | 1.2 | 1.2 | 2.9% | 3.7% |
| Others | 15.4 | 15.8 | 14.8 | 16.3 | 17.2 | 17.8 | 18.4 | 19.1 | 2.8% | 3.5% |
| Total | 18.7 | 19.2 | 18.0 | 19.8 | 20.9 | 21.6 | 22.3 | 23.2 | 2.8% | 3.5% |

Source: Maia Research, CAREEDGE Research

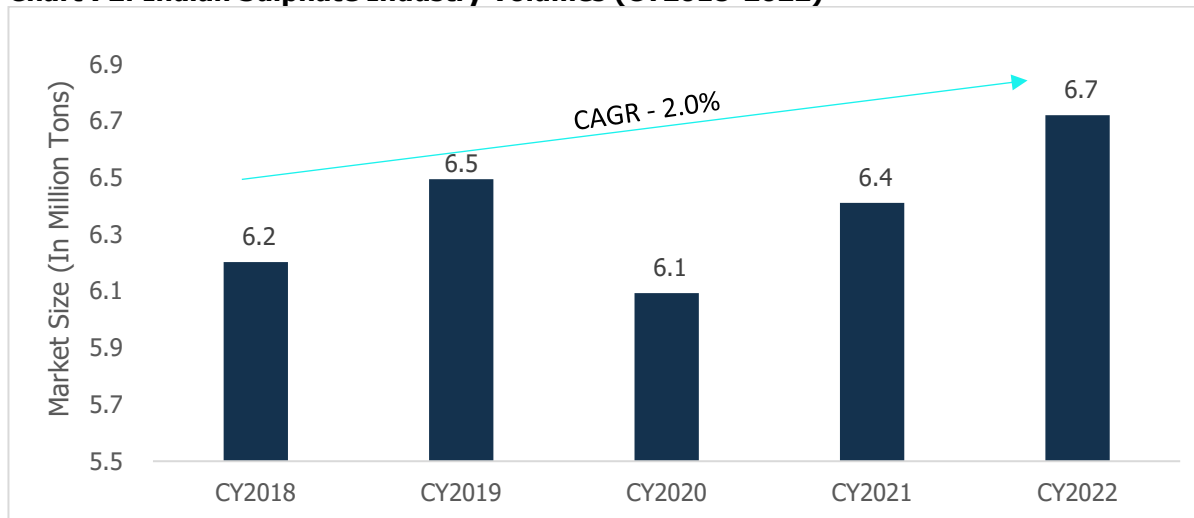
Note: F: Forecast

7.5 Indian Sulphate Industry

7.5.1 Volume

The Indian sulphate industry’s consumption volumes grew at a CAGR of 2.0% from 6.2 million tonnes in CY2018 to 6.7 million tonnes in CY2022.

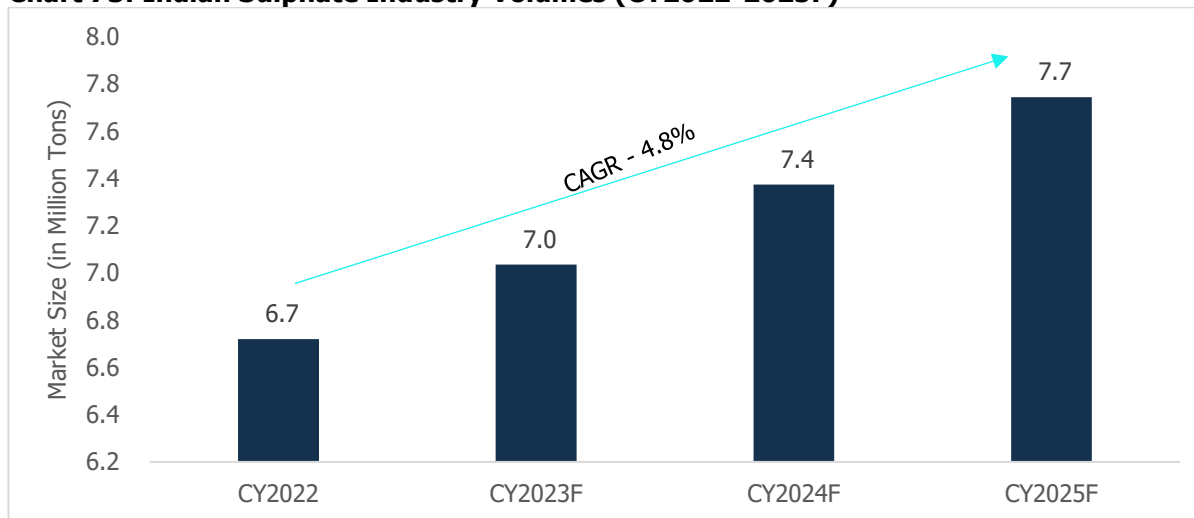
Chart 72: Indian Sulphate Industry Volumes (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The Indian sulphate industry’s consumption volumes are expected to grow from 6.7 million tonnes in CY2022 to 7.7 million tonnes in CY2025, at a CAGR of 4.8%.

Chart 73: Indian Sulphate Industry Volumes (CY2022-2025F)



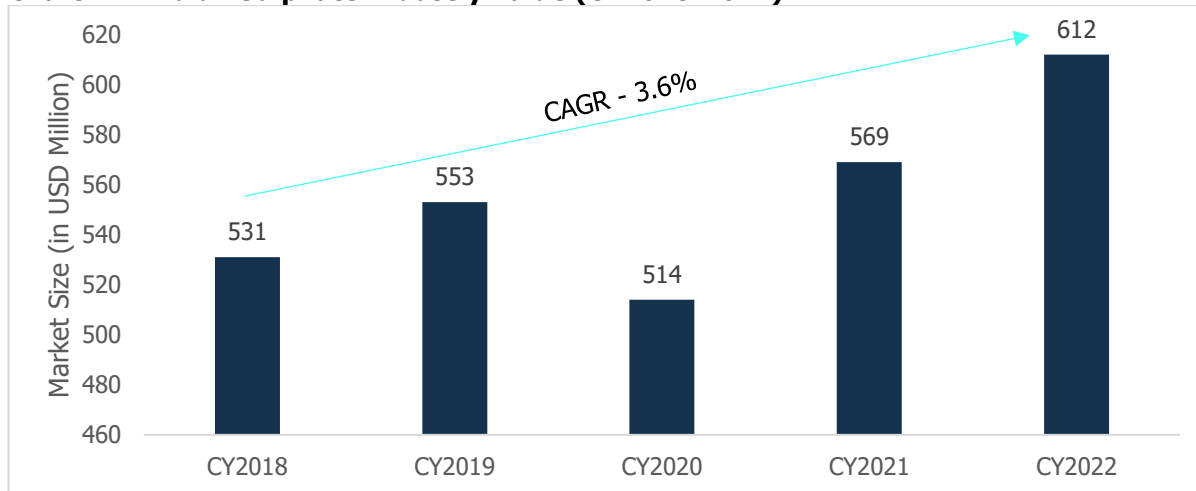
Source: Maia Research, CAREEDGE Research

Note: F: Forecast

7.5.2 Value

The Indian sulphate industry grew at a CAGR of 3.6% from USD 531 million in CY2018 to USD 612 million in CY2022.

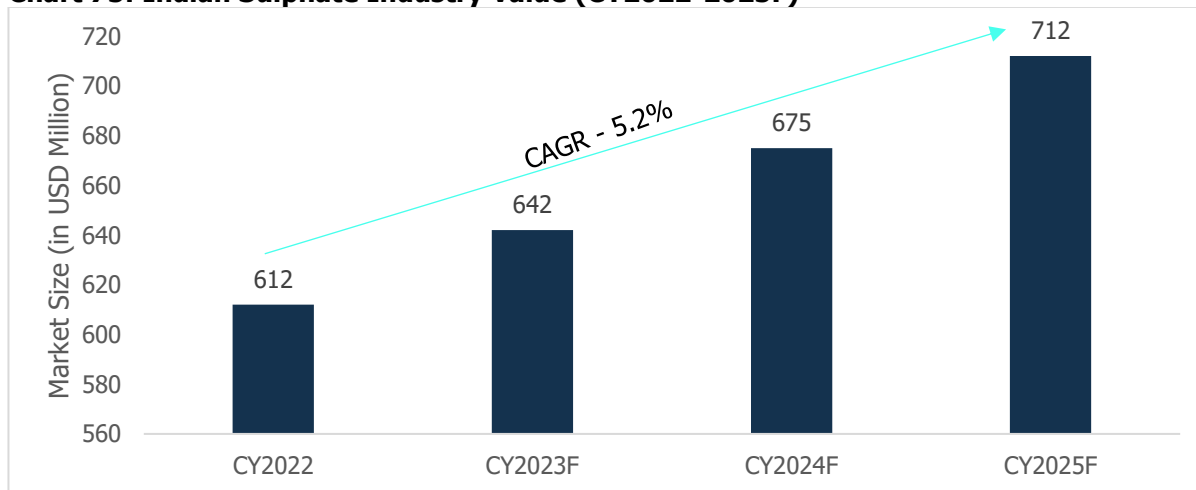
Chart 74: Indian Sulphate Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The Indian sulphate consumption value is expected to grow from USD 612 million in CY2022 to USD 712 million in CY2025, at a CAGR of 5.2%, driven primarily by an increase in consumption volumes.

Chart 75: Indian Sulphate Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F: Forecast

7.5.3 Break-Up of Indian Sulphate Industry Value and Volume by Grade

The pharma grade sulphates have demonstrated a CAGR of 3.5%, reagent grade -0.1%, and nutraceutical grade 2.3% in volume terms, over CY2018-2022. The pharma grade sulphates is expected to demonstrate a CAGR of 5.4%, reagent grade 3.6% and nutraceutical grade 4.4% in volume terms, over CY2022-2025.

Table 34: Break-Up of Indian Sulphate Industry Volume by Grade (In Thousand Tonnes)

| Grade | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023 F | CY2024 F | CY2025 F | CAGR (CY18-CY22) | CAGR (CY22-CY25F) |
|-----------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------------------|-------------------|
| Pharma Grade | 45.3 | 46.8 | 46.2 | 48.9 | 51.9 | 54.6 | 57.4 | 60.7 | 3.5% | 5.4% |
| IP | 15.2 | 15.9 | 15.7 | 16.6 | 17.7 | 18.6 | 19.4 | 20.2 | 3.9% | 4.5% |
| BP | 5.7 | 5.9 | 5.9 | 6.2 | 6.6 | 7.1 | 7.6 | 8.1 | 3.7% | 7.1% |
| EP | 10.4 | 10.6 | 10.5 | 11.1 | 11.5 | 12.1 | 12.5 | 13.0 | 2.5% | 4.2% |
| USP | 11.2 | 11.5 | 11.1 | 11.7 | 12.6 | 13.1 | 14.0 | 15.0 | 3.0% | 6.0% |
| JP | 2.8 | 3.0 | 3.0 | 3.2 | 3.5 | 3.7 | 4.0 | 4.4 | 5.7% | 7.9% |
| Reagent Grade | 45.4 | 46.4 | 42.5 | 43.8 | 45.2 | 46.4 | 48.5 | 50.2 | -0.1% | 3.6% |
| R | 26.5 | 27.0 | 24.8 | 25.5 | 26.3 | 26.8 | 28.1 | 29.1 | -0.2% | 3.4% |
| AR | 10.5 | 10.7 | 9.7 | 10.1 | 10.3 | 10.9 | 11.4 | 11.7 | -0.5% | 4.3% |
| GR | 4.6 | 4.9 | 4.5 | 4.7 | 4.9 | 5.0 | 5.1 | 5.3 | 1.6% | 2.7% |
| ACS | 3.8 | 3.9 | 3.5 | 3.5 | 3.6 | 3.7 | 3.8 | 4.0 | -1.3% | 3.6% |
| Nutraceuticals Grade (FCC) | 42.7 | 45.0 | 42.7 | 44.4 | 46.8 | 48.1 | 50.8 | 53.3 | 2.3% | 4.4% |
| Others | 6,068.0 | 6,357.0 | 5,962.0 | 6,274.0 | 6,576.0 | 6,886.0 | 7,218.0 | 7,580.0 | 2.0% | 4.9% |
| Total | 6,202.0 | 6,495.0 | 6,093.0 | 6,411.0 | 6,720.0 | 7,035.0 | 7,374.0 | 7,744.0 | 2.0% | 4.8% |

Source: Maia Research, CAREEDGE Research

F: Forecast

The pharma grade sulphates have demonstrated a CAGR of 5.0%, reagent grade 1.6%, and nutraceutical grade 3.6% in value terms, over CY2018-2022. The market for these grades is expected to increase by CAGR of 5.7%, 3.6%, and 5.4%, respectively, in value terms, over CY2022-25.

Table 35: Break-Up of Indian Sulphate Industry Value by Grade (In USD Million)

| Grade | CY18 | CY19 | CY20 | CY21 | CY22 | CY23F | CY24F | CY25F | CAGR (CY18-CY22) | CAGR (CY22-CY25F) |
|-----------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------------|-------------------|
| Pharma Grade | 34.0 | 35.1 | 34.4 | 38.2 | 41.3 | 43.6 | 46.0 | 48.8 | 5.0% | 5.7% |
| IP | 11.2 | 11.6 | 11.4 | 12.6 | 13.7 | 14.4 | 15.3 | 16.2 | 5.2% | 5.7% |
| BP | 4.3 | 4.5 | 4.4 | 4.9 | 5.3 | 5.6 | 5.9 | 6.3 | 5.4% | 5.9% |
| EP | 7.9 | 8.1 | 7.9 | 8.7 | 9.4 | 9.9 | 10.4 | 11.0 | 4.6% | 5.2% |
| USP | 8.5 | 8.8 | 8.6 | 9.5 | 10.2 | 10.8 | 11.3 | 12.0 | 4.7% | 5.3% |
| JP | 2.1 | 2.2 | 2.2 | 2.5 | 2.7 | 2.9 | 3.1 | 3.4 | 6.8% | 7.4% |
| Reagent Grade | 24.7 | 25.3 | 22.8 | 24.8 | 26.3 | 27.2 | 28.1 | 29.2 | 1.6% | 3.6% |
| R | 13.7 | 14.1 | 12.7 | 13.8 | 14.6 | 15.1 | 15.6 | 16.2 | 1.6% | 3.5% |
| AR | 5.8 | 6.0 | 5.4 | 5.9 | 6.2 | 6.4 | 6.6 | 6.9 | 1.7% | 3.7% |
| GR | 2.7 | 2.8 | 2.5 | 2.8 | 2.9 | 3.0 | 3.2 | 3.3 | 2.0% | 3.8% |
| ACS | 2.4 | 2.5 | 2.2 | 2.4 | 2.5 | 2.6 | 2.7 | 2.8 | 1.4% | 3.4% |
| Nutraceuticals Grade (FCC) | 26.1 | 27.2 | 25.2 | 28.0 | 30.2 | 31.7 | 33.5 | 35.4 | 3.6% | 5.4% |
| Others | 447.0 | 465.0 | 432.0 | 478.0 | 514.0 | 539.0 | 567.0 | 598.0 | 3.6% | 5.2% |
| Total | 531.0 | 553.0 | 514.0 | 569.0 | 612.0 | 642.0 | 675.0 | 712.0 | 3.6% | 5.2% |

Source: Maia Research, CAREEDGE Research

F: Forecast

8. Global Gluconate Industry

8.1 Overview

Gluconates are salts of gluconic acid, a naturally occurring organic acid. They are produced by fermenting glucose, a sugar derived from corn or other starch-based crops. They are used in a variety of products, including food & beverages, pharmaceuticals, personal care products, and industrial applications.

Table 36: Types of Gluconate

| Types | Description |
|----------------------------|---|
| Calcium Gluconate | Calcium gluconate finds applications in the pharmaceutical, food/feed, veterinary pharmaceutical, and agricultural sectors. It is administered intravenously as a medication to address conditions such as low blood calcium, elevated blood potassium levels, and magnesium toxicity. Typically, supplementation becomes necessary when dietary calcium intake is insufficient. |
| Potassium Gluconate | Potassium gluconate is categorized as a food additive by the FDA since it is a salt of the potassium cation. Additionally, it serves as a potassium supplement. In technical applications, it finds utility as a sequestering agent in textiles and for galvanic surface treatment. |
| Sodium Gluconate | Due to its outstanding ability to inhibit corrosion and scale formation, sodium gluconate finds extensive application as a water quality stabilizer in cooling water systems. It is also employed for the thorough cleaning of steel surfaces and glass bottles, and as an additive in the cement industry. |
| Zinc Gluconate | Zinc gluconate serves primarily as a mineral source incorporated into functional foods, beverages, and dietary supplement formulations. Its exceptional solubility characteristics render it well-suited for both liquid and powdered applications. This compound functions as a zinc supplement, primarily employed to address conditions like growth retardation, malnutrition, anorexia, recurrent oral ulcers, and skin acne resulting from zinc deficiency in infants and expectant mothers. |

Source: CAREEDGE Research

Table 37: Application of Gluconates

| Applications Description | Applications Description |
|---|--|
| Nutraceuticals and Pharmaceuticals | Gluconate is often employed to address mineral deficiencies. Gluconates are also utilized in nutraceuticals to provide essential minerals like calcium, magnesium, and zinc in a form that the body can easily absorb. They enhance the nutritional value of dietary supplements, functional foods, and beverages, contributing to overall health and well-being. Their solubility and minimal taste impact make them popular in nutraceutical products. |
| Food & Beverage | Gluconate is a frequently utilized food additive and dietary supplement in the food and beverage sector. It serves to modify flavours and enhance the nutritional content of various food and beverage products. |
| Construction | Gluconate is mainly used as a cement retarder and water absorbent in industry. |
| Veterinary | Gluconates, such as calcium gluconate, may be used in veterinary medicine. Calcium gluconate, for example, can be administered to animals to address calcium deficiencies or as a supplement during certain medical conditions. |

| | |
|----------------------|---|
| Biotech | Gluconates can be used in biotechnology, particularly in cell culture media and buffer solutions. Calcium gluconate, sodium gluconate, and other gluconate salts may find applications in bioprocessing and research. |
| Metallurgy | Gluconates can be used in metallurgy, often as corrosion inhibitors and as chelating agents in metal cleaning processes. The chelating properties of gluconates can help in the removal of scale and deposits from metal surfaces. |
| Electronics | Gluconates may find applications in the electronics industry, particularly in the formulation of certain chemical solutions used in electronic component manufacturing. The chelating properties of gluconates can be beneficial in some industrial cleaning processes. |
| Personal Care | Gluconates are used in personal care products and cosmetics. Sodium gluconate, for example, may be used as a chelating agent or stabilizer in various formulations, including shampoos, skincare products, and other cosmetic applications. |

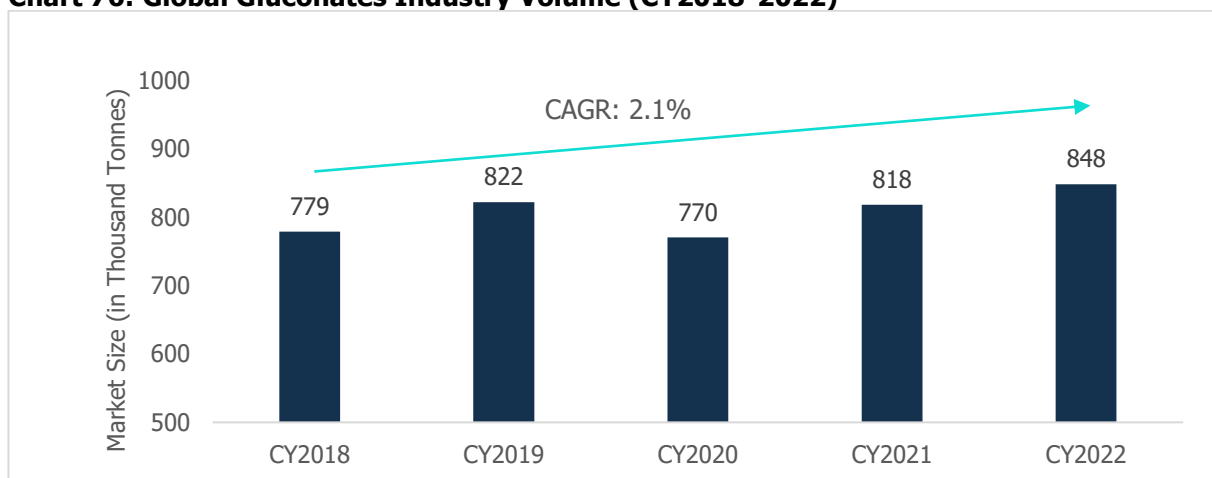
Source: CAREEDGE Research

8.2 Global Gluconates Industry – Market Size

8.2.1 Volume

The global gluconates industry volumes grew at 2.1% CAGR from 779 thousand tonnes in CY2018 to 848 thousand tonnes in CY2022.

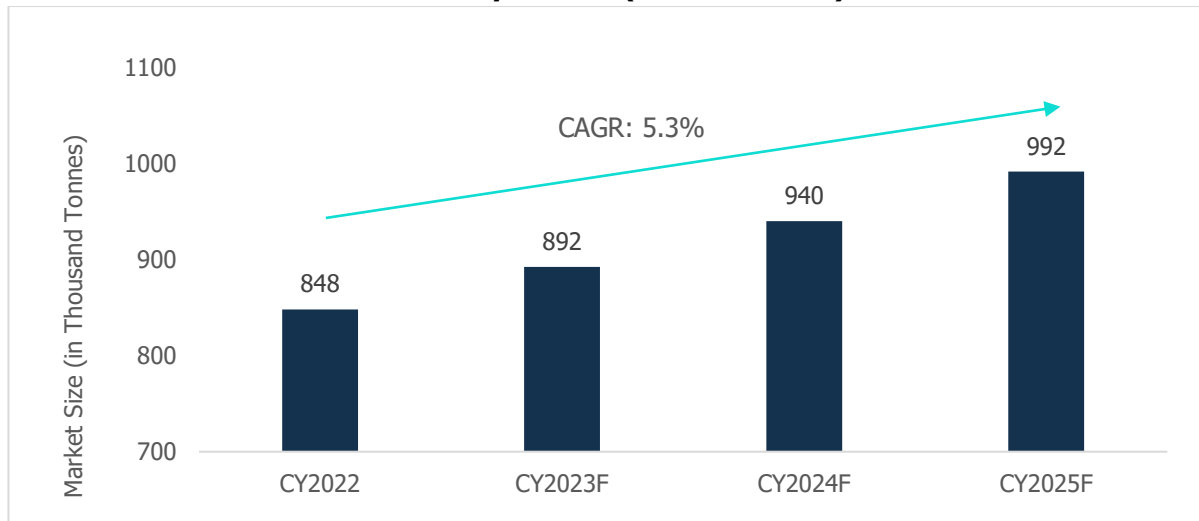
Chart 76: Global Gluconates Industry Volume (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The global gluconates industry volumes are expected to increase from 848 thousand tonnes in CY2022 to 992 thousand tonnes in CY2025, at a CAGR of 5.3%.

Chart 77: Global Gluconates Industry Volume (CY2022-2025E)



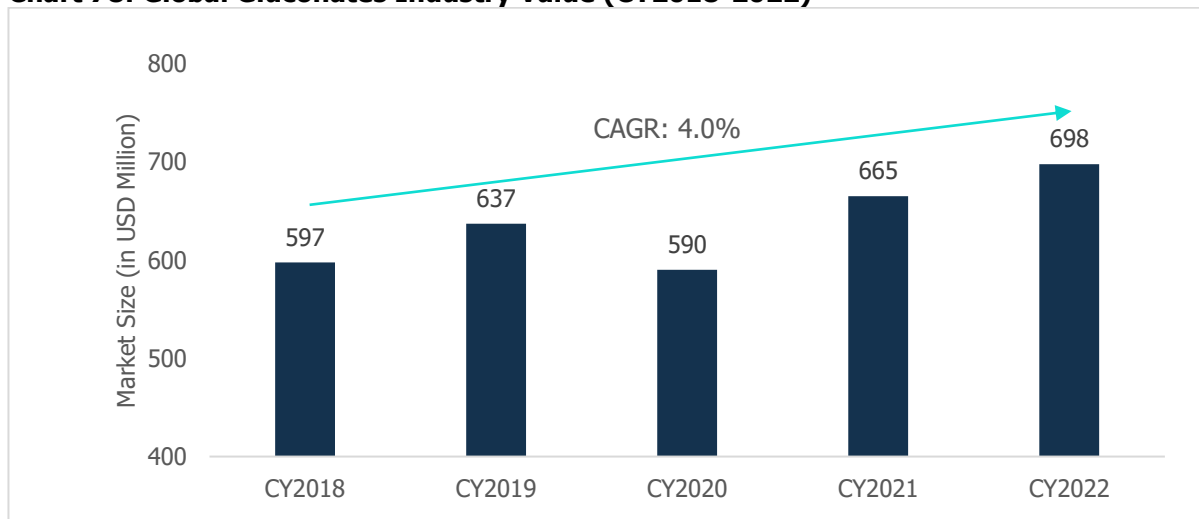
Source: Maia Research, CAREEDGE Research

Note: F: Forecast

8.2.2 Value

The global gluconates industry value has witnessed expansion at a CAGR of 4.0%, from USD 597 million in CY2018 to USD 698 million in CY2022.

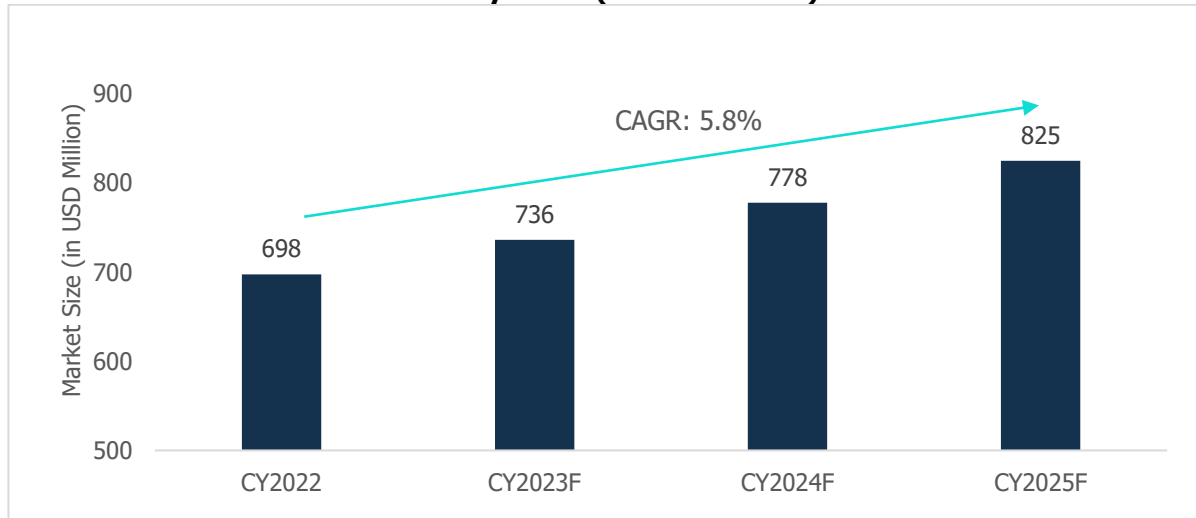
Chart 78: Global Gluconates Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The global gluconates industry is anticipated to witness a modest increase in size, projected to grow from USD 698 million in CY2022 to USD 825 million by CY2025, driven by volume growth.

Chart 79: Global Gluconates Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F: Forecast

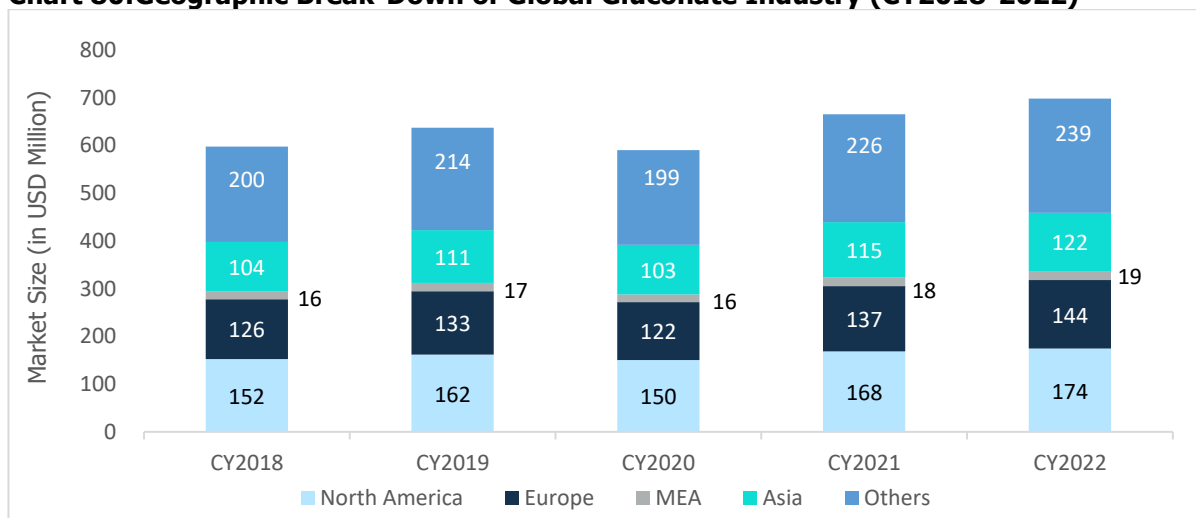
8.3 Break-Up of Global Gluconate Industry Value by Geography

The North American region is the largest market for gluconate, representing 25% of the global market share in CY2022. The region has demonstrated a CAGR of 3.5% from CY2018 to CY2022.

Further, in CY2022, the European region stands as the world's second-largest market for gluconates, commanding approximately 21% of the global market share. This region has witnessed a CAGR of 3.4% from CY2018 to CY2022.

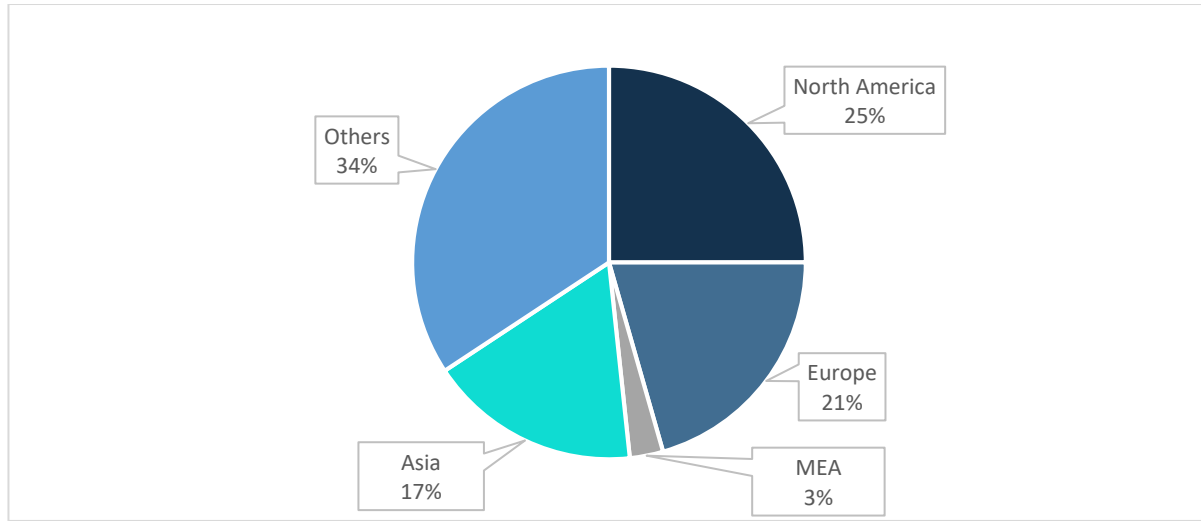
Asia is the third-largest market for gluconate, accounting for 17% of the global market share in CY2022. This region's consumption has grown at a CAGR of 4.0% from CY2018 to CY2022.

Chart 80: Geographic Break-Down of Global Gluconate Industry (CY2018-2022)



Source: Maia Research, CAREEDGE Research

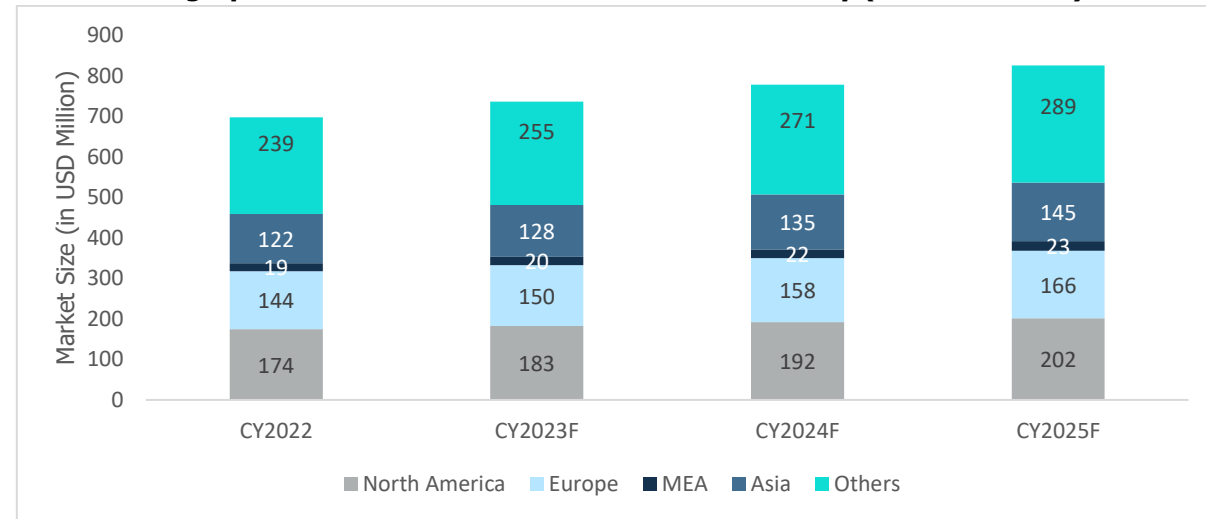
Chart 81:Geography-Wise Market Share (CY2022)



Source: Maia Research, CAREEDGE Research

North America is expected to remain the largest market for gluconate with an expected contribution of around 24% by CY2025

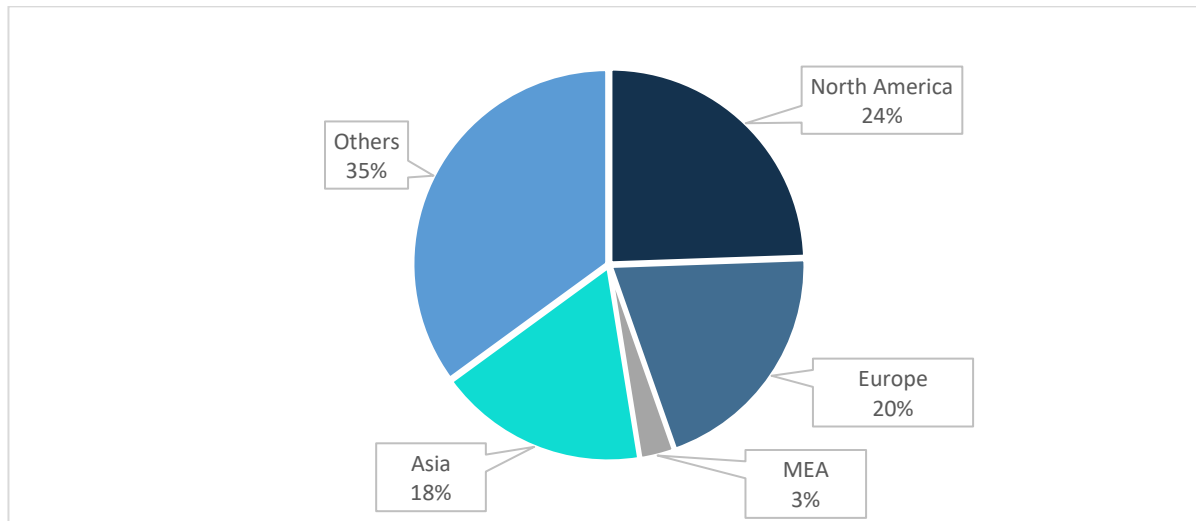
Chart 82:Geographic Break-Down of Global Gluconate Industry (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F: Forecast

Chart 83: Geography-Wise Market Share (CY2025F)



Source: Maia Research, CAREEDGE Research

8.4 Break-Up of Global Gluconate Industry by Grade

The pharma grade gluconates have demonstrated a CAGR of 3.5%, reagent grade mere 0.1% and nutraceutical grade 3.1% in volume terms, over CY2018-2022. The pharma grade gluconates are expected to demonstrate a CAGR of 5.7%, reagent grade 3.4% and nutraceutical grade 5.8% in volume terms, over CY2022-2025.

Table 38: Break-Up of Global Gluconate Industry by Grade (In thousand tonnes)

| Grades | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023F | CY2024F | CY2025F | CAGR | |
|----------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|
| | | | | | | | | | CY2018-22 | CY2022-25F |
| Pharma Grade | 128.0 | 134.6 | 133.0 | 140.7 | 146.7 | 154.0 | 162.8 | 173.2 | 3.5% | 5.7% |
| IP | 8.2 | 8.6 | 8.5 | 9.1 | 9.4 | 9.7 | 10.3 | 10.8 | 3.5% | 4.7% |
| BP | 12.3 | 13.2 | 12.9 | 13.8 | 14.6 | 15.2 | 16.0 | 17.3 | 4.4% | 5.8% |
| EP | 44.9 | 46.4 | 45.0 | 47.4 | 49.6 | 52.6 | 54.4 | 57.1 | 2.5% | 4.8% |
| USP | 52.2 | 55.0 | 55.1 | 57.7 | 59.5 | 62.1 | 66.6 | 71.2 | 3.3% | 6.2% |
| JP | 10.4 | 11.4 | 11.6 | 12.7 | 13.6 | 14.4 | 15.4 | 16.8 | 6.9% | 7.3% |
| Reagent Grade | 41.0 | 42.7 | 38.5 | 40.0 | 41.1 | 42.2 | 44.3 | 45.4 | 0.1% | 3.4% |
| R | 21.6 | 22.3 | 20.1 | 20.9 | 21.7 | 22.1 | 23.3 | 23.7 | 0.1% | 3.0% |
| AR | 8.3 | 8.7 | 7.8 | 8.1 | 8.2 | 8.5 | 8.9 | 9.2 | -0.3% | 3.9% |
| GR | 6.8 | 7.1 | 6.5 | 6.8 | 6.9 | 7.3 | 7.6 | 7.8 | 0.4% | 4.2% |
| ACS | 4.3 | 4.5 | 4.0 | 4.3 | 4.3 | 4.4 | 4.6 | 4.8 | 0.0% | 3.7% |
| Nutraceutical Grade (FCC) | 76.6 | 81.1 | 76.9 | 82.9 | 86.7 | 92.2 | 97.9 | 102.6 | 3.1% | 5.8% |
| Others | 533.4 | 563.4 | 522.0 | 554.6 | 573.5 | 603.8 | 634.8 | 670.2 | 1.8% | 5.3% |
| Total | 779.0 | 821.8 | 770.3 | 818.3 | 848.1 | 892.1 | 939.8 | 991.5 | 2.1% | 5.3% |

Source: Maia Research, CAREEDGE Research

Note: F: Forecast

The pharmaceutical-grade gluconate exhibited a CAGR of 5.4%, while the reagent grade recorded a CAGR of 2.0%, and the nutraceutical grade a CAGR of 4.0% in terms of value during the period from CY2018 to CY2022.

Table 39: Break-Up of Global Gluconate Industry by Grade (In USD Million)

| Grades | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023F | CY2024F | CY2025F | CAGR | |
|----------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|
| | | | | | | | | | CY2018-22 | CY2022-25F |
| Pharma Grade | 152.7 | 161.9 | 157.9 | 178.8 | 188.5 | 199.8 | 212.1 | 226.1 | 5.4% | 6.2% |
| IP | 9.6 | 10.1 | 9.9 | 11.2 | 11.8 | 12.5 | 13.3 | 14.1 | 5.4% | 6.1% |
| BP | 14.6 | 15.5 | 15.2 | 17.2 | 18.2 | 19.4 | 20.6 | 22.1 | 5.7% | 6.5% |
| EP | 53.5 | 56.5 | 54.9 | 61.9 | 64.9 | 68.5 | 72.4 | 76.8 | 4.9% | 5.8% |
| USP | 62.7 | 66.4 | 64.8 | 73.3 | 77.2 | 81.7 | 86.7 | 92.4 | 5.3% | 6.2% |
| JP | 12.3 | 13.3 | 13.2 | 15.3 | 16.4 | 17.7 | 19.1 | 20.7 | 7.4% | 8.2% |
| Reagent Grade | 39.2 | 41.3 | 37.0 | 41.1 | 42.4 | 44.1 | 45.9 | 47.9 | 2.0% | 4.2% |
| R | 19.5 | 20.5 | 18.4 | 20.4 | 21.1 | 21.8 | 22.8 | 23.7 | 1.9% | 4.0% |
| AR | 8.1 | 8.5 | 7.6 | 8.5 | 8.7 | 9.1 | 9.5 | 9.9 | 2.0% | 4.3% |
| GR | 6.9 | 7.3 | 6.6 | 7.3 | 7.6 | 7.9 | 8.2 | 8.6 | 2.3% | 4.4% |
| ACS | 4.8 | 5.0 | 4.5 | 4.9 | 5.1 | 5.3 | 5.5 | 5.7 | 1.7% | 3.9% |
| Nutraceutical Grade (FCC) | 77.0 | 82.2 | 75.8 | 85.6 | 90.0 | 95.3 | 101.0 | 107.4 | 4.0% | 6.0% |
| Others | 328.6 | 351.7 | 319.3 | 359.5 | 376.7 | 397.0 | 419.0 | 443.8 | 3.5% | 5.6% |
| Total | 597.5 | 637.1 | 590.0 | 665.0 | 697.6 | 736.2 | 778.0 | 825.2 | 4.0% | 5.8% |

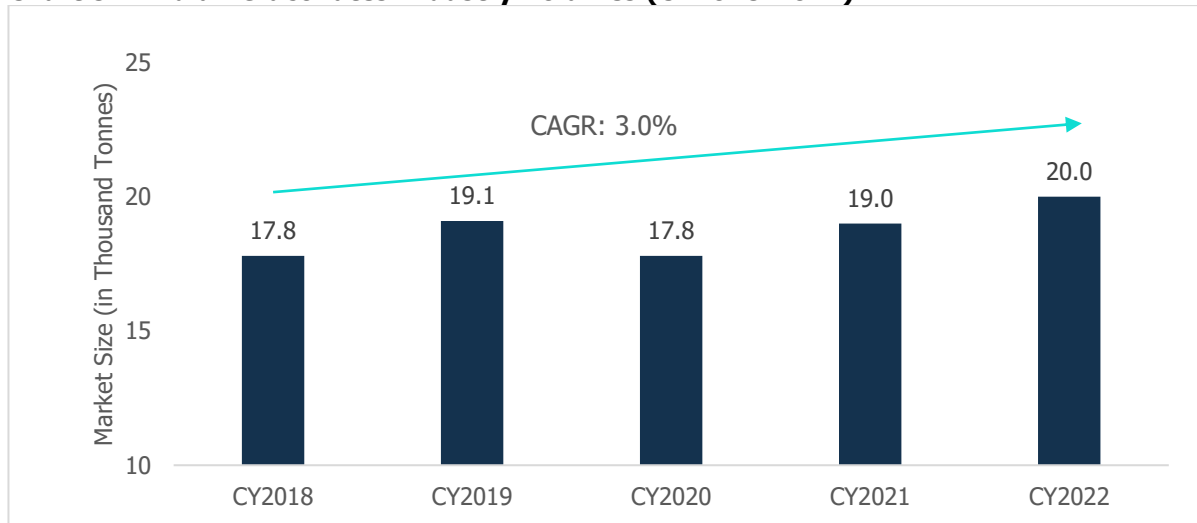
Source: Maia Research, CAREEDGE Research

Note: F: Forecast

8.5 Indian Gluconates Industry

8.5.1 Volume

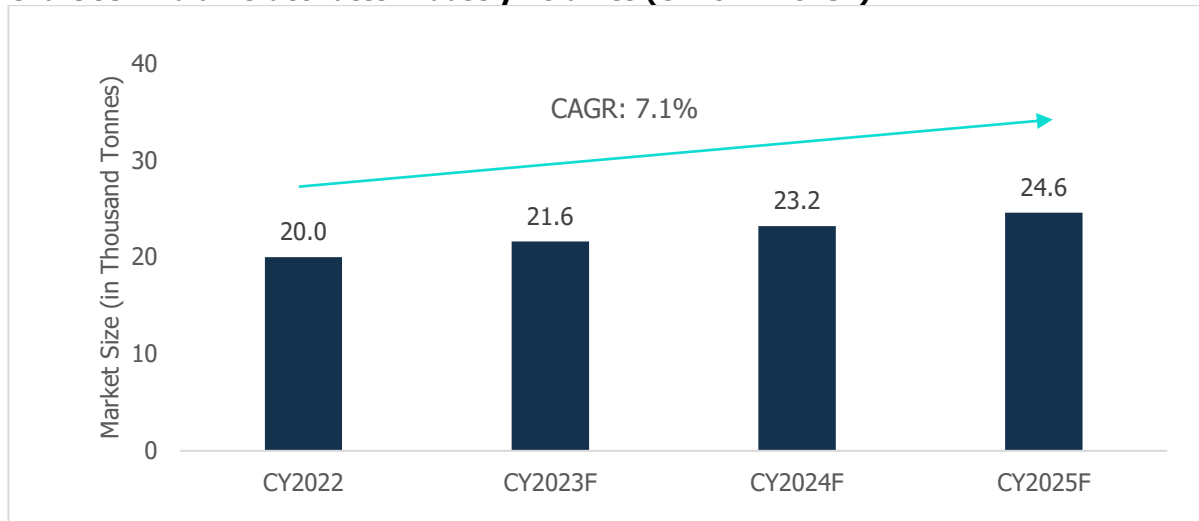
The Indian gluconates industry volumes have grown at a CAGR of 2% from 17.8 thousand tonnes in CY2018 to 20 thousand tonnes in CY2022.

Chart 84: Indian Gluconates Industry Volumes (CY2018-2022)


Source: Maia Research, CAREEDGE Research

The industry volumes are expected to grow from 20 thousand tonnes in CY2022 to 24.6 thousand tonnes in CY2025, at a CAGR of 7.1%.

Chart 85: Indian Gluconates Industry Volumes (CY2022-2025E)

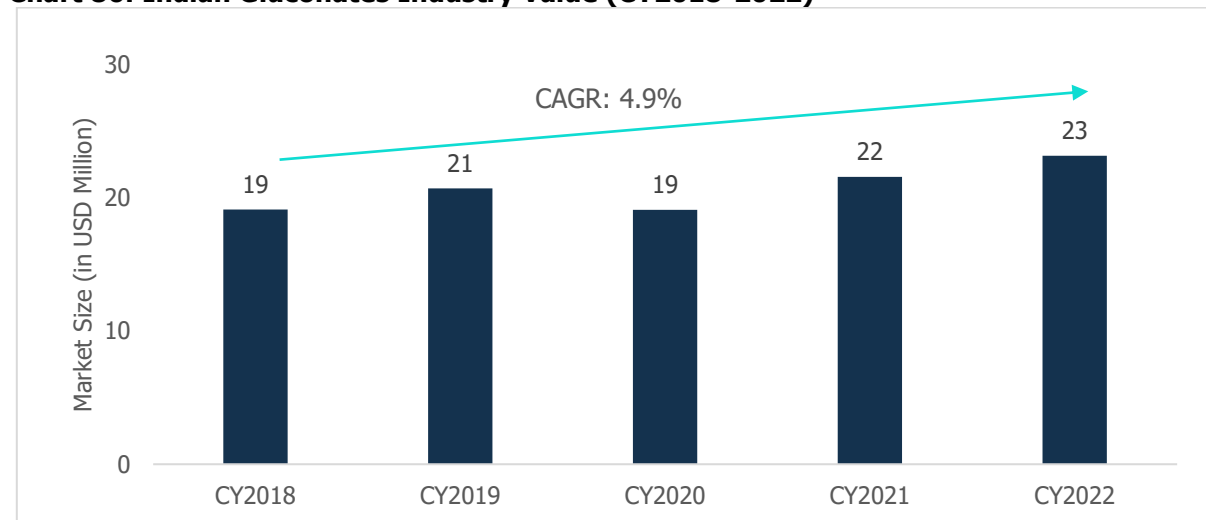


Source: Maia Research, CAREEDGE Research
Note: F: Forecast

8.5.2 Value

The Indian gluconate industry grew at a CAGR of 4.9% in value terms from CY2018 to CY2022.

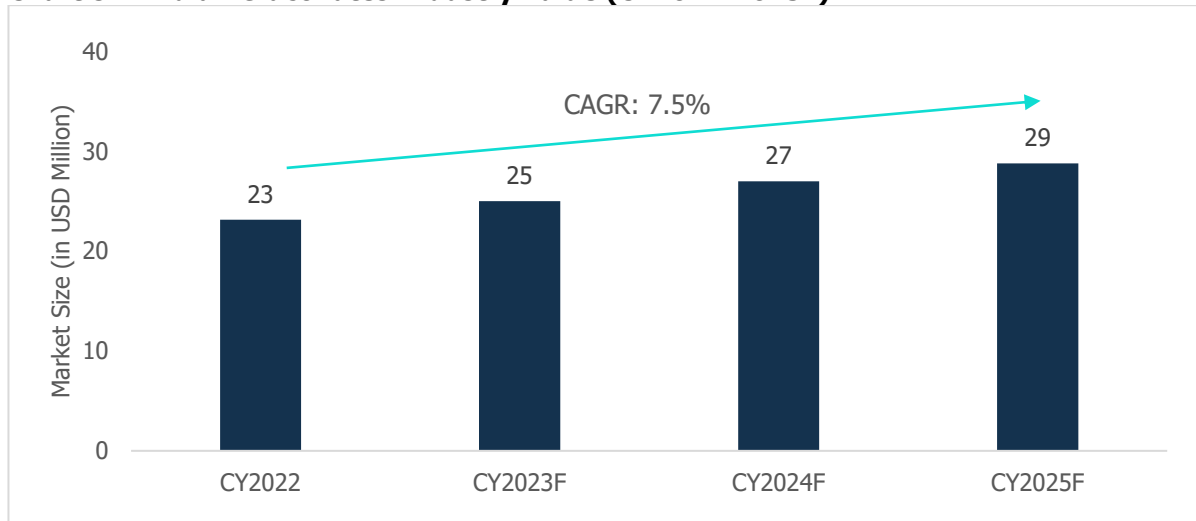
Chart 86: Indian Gluconates Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The gluconate industry is expected to project a revenue growth from USD 23 million in CY2022 to USD 29 million in CY2025, at a CAGR of approximately 7.5%, driven by growth in volumes.

Chart 87: Indian Gluconates Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F: Forecast

8.5.3 Break-Up of Indian Gluconates Industry by Grade

The pharma grade gluconates have demonstrated a CAGR of 5.3%, reagent grade 1.8%, and nutraceutical grade 4.4% in volume terms, over CY2018-2022. The pharma grade gluconates is expected to demonstrate a CAGR of 7.5%, reagent grade 5.5% and nutraceutical grade 6.4% in volume terms, over CY2022-2025.

Table 40: Break-up of Indian Gluconate Industry by Grade (In Thousand Tonnes)

| Grades | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023F | CY2024F | CY2025F | CAGR | |
|----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | | | | | | | | | CY2018-22 | CY2022-25F |
| Pharma Grade | 4.4 | 4.6 | 4.7 | 5.0 | 5.4 | 5.8 | 6.3 | 6.7 | 5.3% | 7.5% |
| IP | 1.1 | 1.1 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 | 5.9% | 6.8% |
| BP | 0.5 | 0.6 | 0.6 | 0.6 | 0.7 | 0.7 | 0.8 | 0.9 | 5.5% | 9.5% |
| EP | 1.1 | 1.2 | 1.2 | 1.3 | 1.3 | 1.4 | 1.5 | 1.6 | 4.4% | 6.2% |
| USP | 1.4 | 1.5 | 1.5 | 1.6 | 1.7 | 1.9 | 2.0 | 2.2 | 5.1% | 8.0% |
| JP | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 7.5% | 10.4% |
| Reagent Grade | 1.3 | 1.4 | 1.3 | 1.4 | 1.4 | 1.5 | 1.6 | 1.7 | 1.8% | 5.5% |
| R | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.8 | 0.8 | 0.8 | 1.8% | 5.3% |
| AR | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 1.4% | 5.8% |
| GR | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 3.9% | 4.6% |
| ACS | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.0% | 7.7% |
| Nutraceutical Grade (FCC) | 1.9 | 2.1 | 2.0 | 2.2 | 2.3 | 2.4 | 2.6 | 2.8 | 4.4% | 6.4% |
| Others | 10.2 | 10.9 | 9.7 | 10.4 | 11.0 | 11.8 | 12.7 | 13.5 | 1.9% | 7.2% |
| Total | 17.8 | 19.1 | 17.8 | 19.0 | 20.0 | 21.6 | 23.2 | 24.6 | 3.0% | 7.1% |

Source: Maia Research, CAREEDGE Research

Note: F: Forecast

Over the period from CY2018 to CY2022, pharmaceutical-grade gluconate exhibited a CAGR of 6.3%, reagent-grade gluconate saw a CAGR of 2.9%, and nutraceutical-grade gluconate recorded a CAGR of 5.0% in terms of value. Going forward, it is anticipated that the market for these gluconate grades will maintain a consistent growth trajectory in terms of value from CY2022 to CY2025.

Table 41: Break-up of Indian Gluconate Industry by Grade (In USD Million)

| Grades | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 | CY2023F | CY2024F | CY2025F | CAGR | |
|----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | | | | | | | | | CY2018-22 | CY2022-25F |
| Pharma Grade | 9.2 | 9.9 | 9.6 | 10.9 | 11.7 | 12.7 | 13.8 | 14.8 | 6.3% | 8.0% |
| IP | 2.2 | 2.3 | 2.3 | 2.6 | 2.8 | 3.1 | 3.3 | 3.6 | 6.8% | 8.3% |
| BP | 1.1 | 1.2 | 1.2 | 1.4 | 1.5 | 1.6 | 1.7 | 1.9 | 6.6% | 8.4% |
| EP | 2.3 | 2.5 | 2.4 | 2.8 | 3.0 | 3.2 | 3.4 | 3.7 | 6.0% | 7.6% |
| USP | 3.0 | 3.3 | 3.2 | 3.6 | 3.8 | 4.1 | 4.5 | 4.8 | 6.0% | 7.7% |
| JP | 0.5 | 0.6 | 0.5 | 0.6 | 0.7 | 0.8 | 0.8 | 0.9 | 8.4% | 9.7% |
| Reagent Grade | 1.6 | 1.7 | 1.5 | 1.7 | 1.8 | 1.9 | 2.0 | 2.1 | 2.9% | 5.9% |
| R | 0.8 | 0.8 | 0.7 | 0.8 | 0.8 | 0.9 | 1.0 | 1.0 | 2.9% | 5.6% |
| AR | 0.4 | 0.5 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 2.8% | 5.9% |
| GR | 0.2 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 4.1% | 5.8% |
| ACS | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 1.4% | 6.9% |
| Nutraceutical Grade (FCC) | 2.6 | 2.8 | 2.5 | 2.9 | 3.1 | 3.4 | 3.6 | 3.9 | 5.0% | 7.8% |
| Others | 5.8 | 6.4 | 5.5 | 6.1 | 6.5 | 7.0 | 7.5 | 8.0 | 3.0% | 6.9% |
| Total | 19.1 | 20.7 | 19.1 | 21.6 | 23.2 | 25.0 | 27.0 | 28.8 | 4.9% | 7.5% |

Source: Maia Research, CAREEDGE Research

Note: F: Forecast

9. Global Glycinate Industry

9.1 Overview

Glycinate is an α -amino-acid anion, a conjugate base of glycine, arising from deprotonation of the carboxy group. It has a role as a fundamental metabolite. It is a conjugate base of a glycine.

Table 42: Types of Glycinates

| Types | Description |
|----------------------------|---|
| Zinc Glycinate | Zinc Glycinate helps maintain immune function, healthy skin, and nails, and proper connective tissue formation. It is an essential mineral for human health. However, it is one of the hardest minerals to absorb, along with iron and calcium. |
| Copper Glycinate | Copper Glycinate helps produce and repair connective tissue and form red blood cells. This further aids in the maintenance of good health. When people supplement large doses of zinc (i.e. 50 mg or higher) in the interest of supporting a health condition, it competes with dietary copper for uptake into the bloodstream and can result in copper deficiency. This can affect oxygen utilization, immune function, repair & maintenance of connective tissue, and more. |
| Manganese Glycinate | Manganese Glycinate is composed of trace mineral manganese and an amino acid, glycine. It is easily absorbable and helps the body in a variety of ways including the formation of clotting factors, connective tissue sex hormones, and bones. Further, it helps in the absorption of calcium and the metabolism of carbohydrates and fats. |
| Iron Glycinate | Iron Glycinate is an iron supplement used to treat or prevent low blood levels of iron (such as those caused by anemia or pregnancy). |
| Calcium Glycinate | Calcium Glycinate helps regulate blood pressure and may reduce the risk of heart disease. Calcium is one of the most important minerals, essential for building and maintaining healthy bones. It is also essential for proper functioning of the brain, heart, and muscles. |
| Magnesium Glycinate | Magnesium Glycinate helps relieve anxiety, promotes bone health, controls blood sugar in people with diabetes, may reduce the risk of Type 2 diabetes, and maintain a regular heart rhythm. |
| Others | The others category includes ferrous glycinate, manganese glycinate, cobalt glycinate, chromium glycinate, etc. These products target specific element deficiencies and mineral supplements |

Source: CAREEDGE Research

Table 43: Applications of Glycinates

| Applications | Description |
|--|--|
| Pharmaceuticals/ Nutraceuticals | Nutraceuticals are products used for nutrition and as medicines. A nutraceutical product may be defined as a substance, which has physiological benefits or provides protection against chronic disease. Nutraceuticals may be used to improve health, delay the ageing process, prevent chronic diseases, increase life expectancy, or support the structure or function of the body. |

| | |
|---------------------------|--|
| Reagents | Glycinates are commonly used as complexing agents in analytical chemistry. Complexing agents bind to metal ions and improve their solubility in aqueous solutions. Glycinates are also used as precursors in the synthesis of several organic substances such as peptides, pharmaceuticals and agrochemicals. |
| Food and Beverages | Food and beverages include any raw, cooked, or processed edible substance used or intended for use in whole or in part for human consumption. Glycinate is commonly used in food and beverage additives, such as soy milk, milk powder, etc. It can be used as a food additive to improve the taste, texture, and nutritional value of food products. For example, magnesium glycinate can be used to enhance the flavour of processed foods, while zinc glycinate can be added to fortified cereals and other grain products to improve their zinc content. |
| Feed | A feed ingredient is a component part, constituent, or any combination/mixture added to and comprising the animal food. Feed ingredients might include grains, milling byproducts, added vitamins, minerals, fats/oils, and other nutritional and energy sources. Glycinates are often used as feed additives to provide easily absorbable nutrients to animals, especially pregnant animals and young ones. |
| Metallurgy | Glycinates are used in metallurgical processes as a source of manganese in metal production or refining. |
| Biotechnology | Glycinates are used in biotechnological processes as a source of iron in cell culture media and fermentation. They are also applied in certain biotech formulations due to their stability and bioavailability. |

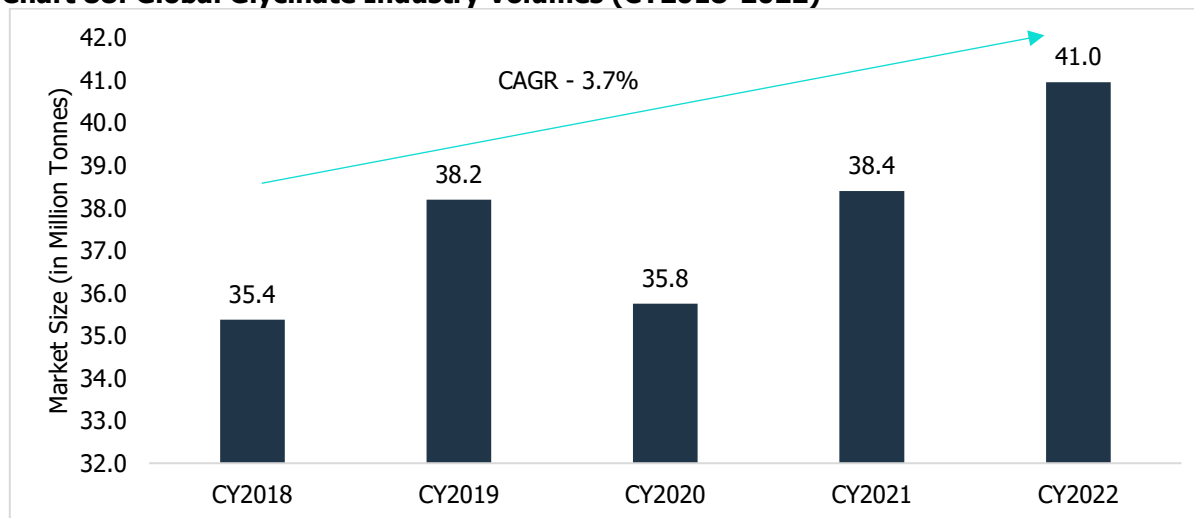
Source: CAREEDGE Research

9.2 Global Glycinate Industry – Market Size

9.2.1 Volume

The global glycinate industry volumes have grown at a CAGR of 3.7% from 35.4 million tonnes in CY2018 to 41.0 million tonnes in CY2022.

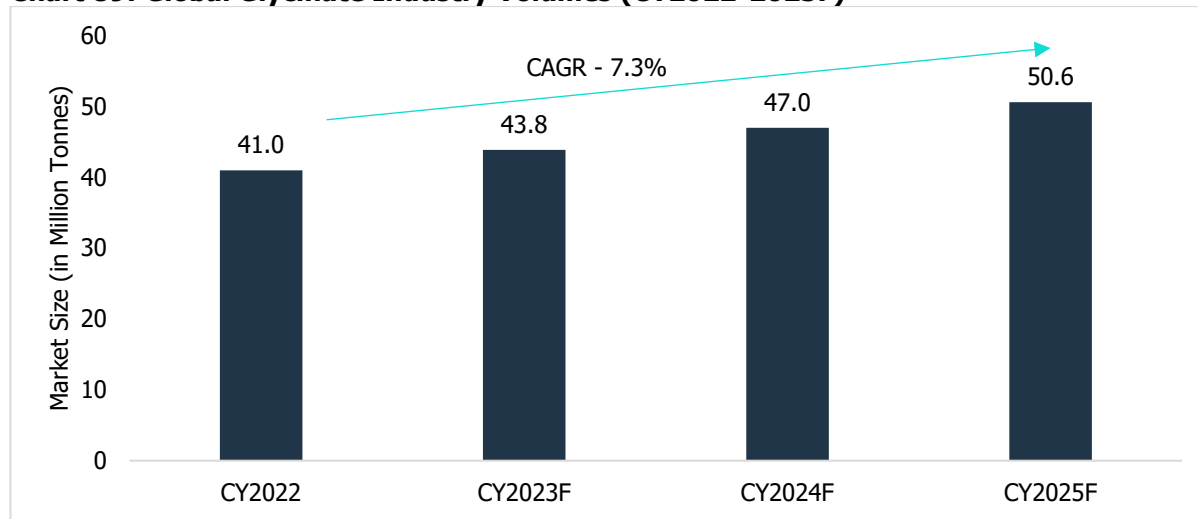
Chart 88: Global Glycinate Industry Volumes (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The global glycinate industry volumes are expected to grow from 41.0 million tonnes in CY2022 to 50.6 million tonnes in CY2025, at a CAGR of 7.3%.

Chart 89: Global Glycinate Industry Volumes (CY2022-2025F)



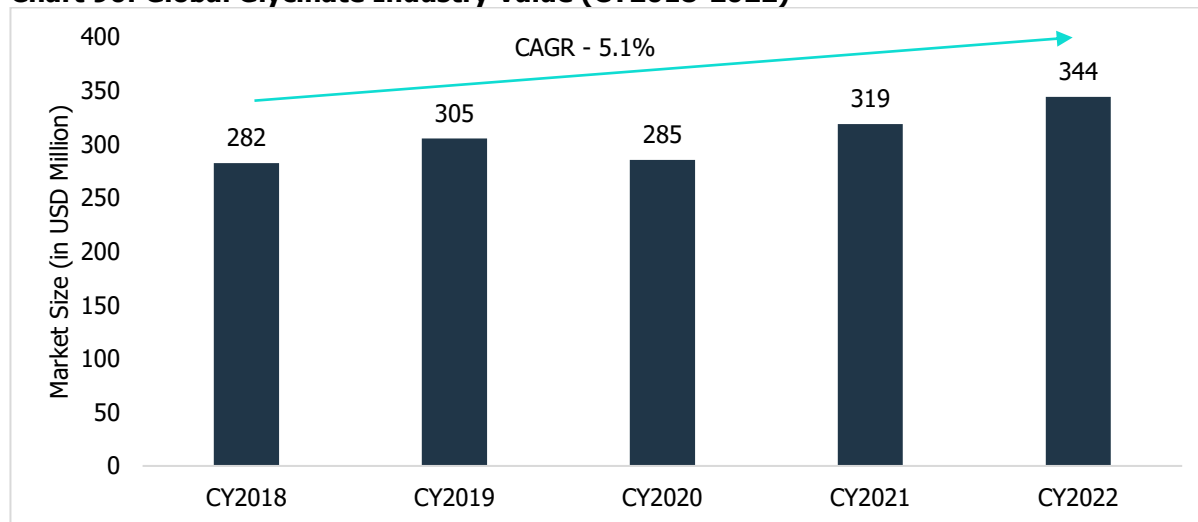
Source: Maia Research, CAREEDGE Research

Note: F - Forecast

9.2.2 Value

The global glycinate industry grew from USD 282.2 million in CY2018 to USD 344 million in CY2022, implying a CAGR of 5.1%.

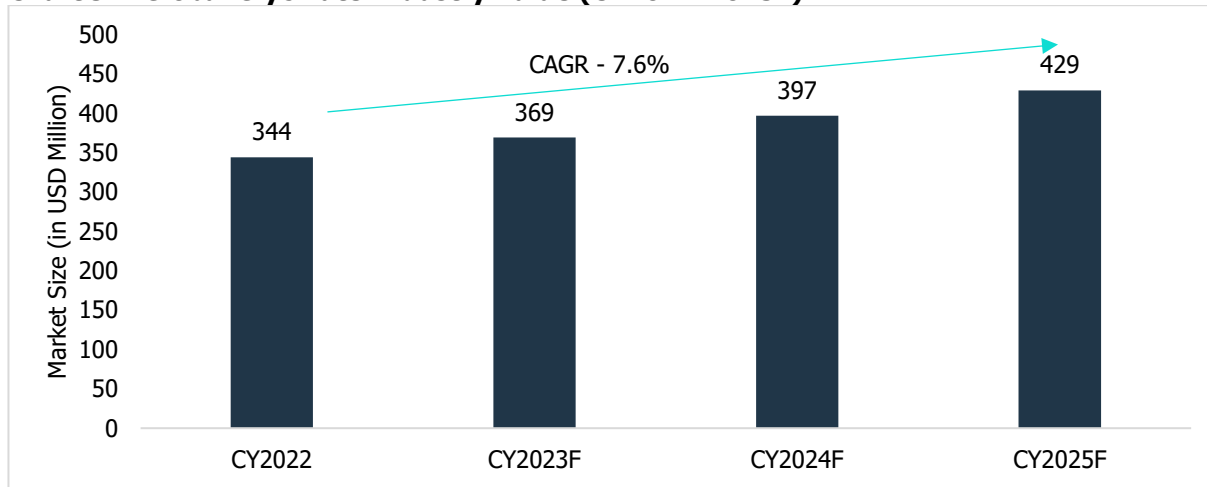
Chart 90: Global Glycinate Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The global glycinate industry is expected to grow at a CAGR of 7.6% over the period CY2022-CY2025 to reach market size of USD 429 million by CY2025, primarily driven by volume growth.

Chart 91: Global Glycinate Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F - Forecast

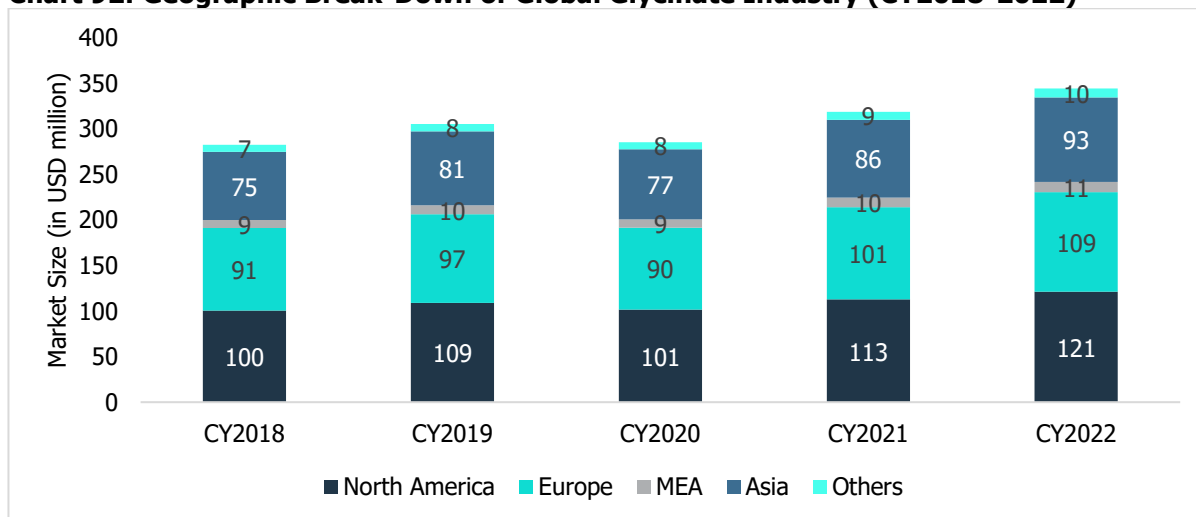
9.3 Break-Up of Global Glycinate Industry Value by Geography

North America has the largest market for glycinate, accounting for around 35% of global demand in CY2022. The glycinate consumption in North America has grown at a CAGR of 4.8% from CY2018 to CY2022.

Europe is the second-largest market for glycinate, accounting for around 32% of the global demand in CY2022. The carbonate consumption value in this region has grown at a CAGR of 4.7% from CY2018 to CY2022.

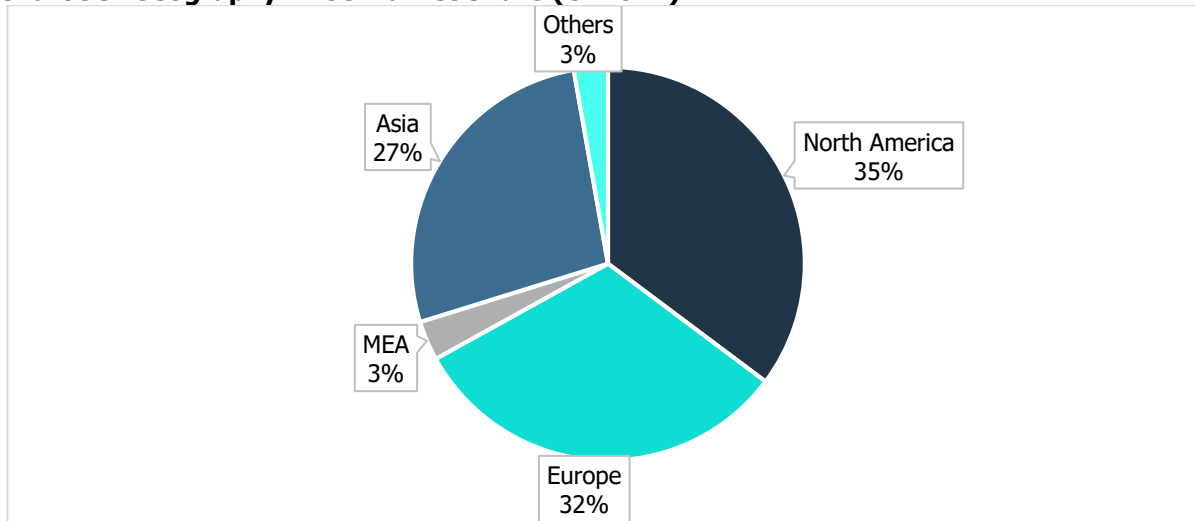
Asia is the third-largest market for glycinate, accounting for around 27% of global demand. The carbonate Market in Asia has grown at a CAGR of 5.6% from CY2018 to CY2022.

Chart 92: Geographic Break-Down of Global Glycinate Industry (CY2018-2022)



Source: Maia Research, CAREEDGE Research

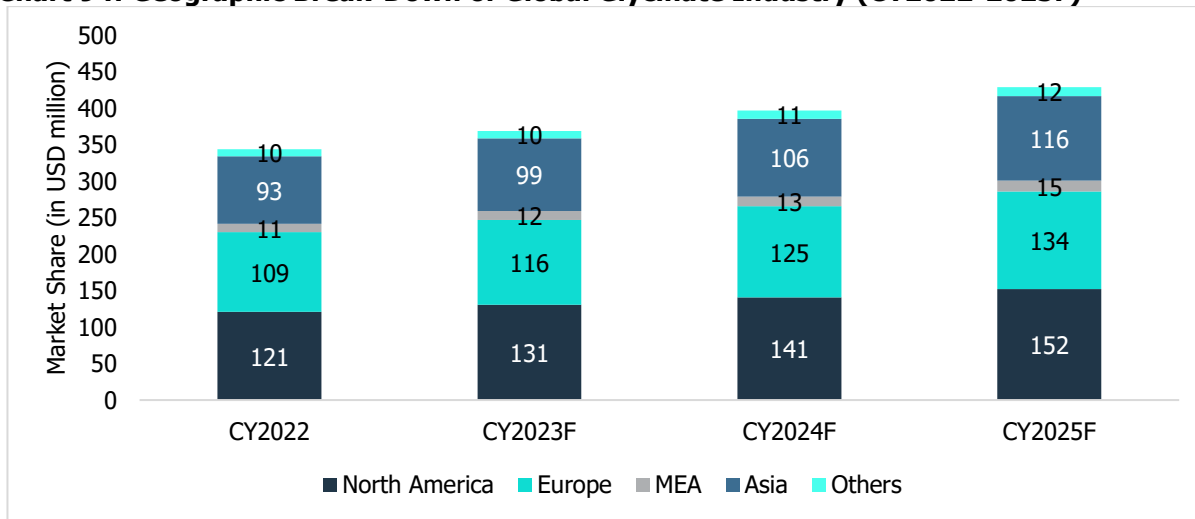
Chart 93: Geography-Wise Market Share (CY2022)



Source: Maia Research, CAREEDGE Research

North America will continue to have the largest market share followed by Europe and Asia by the end of CY2025.

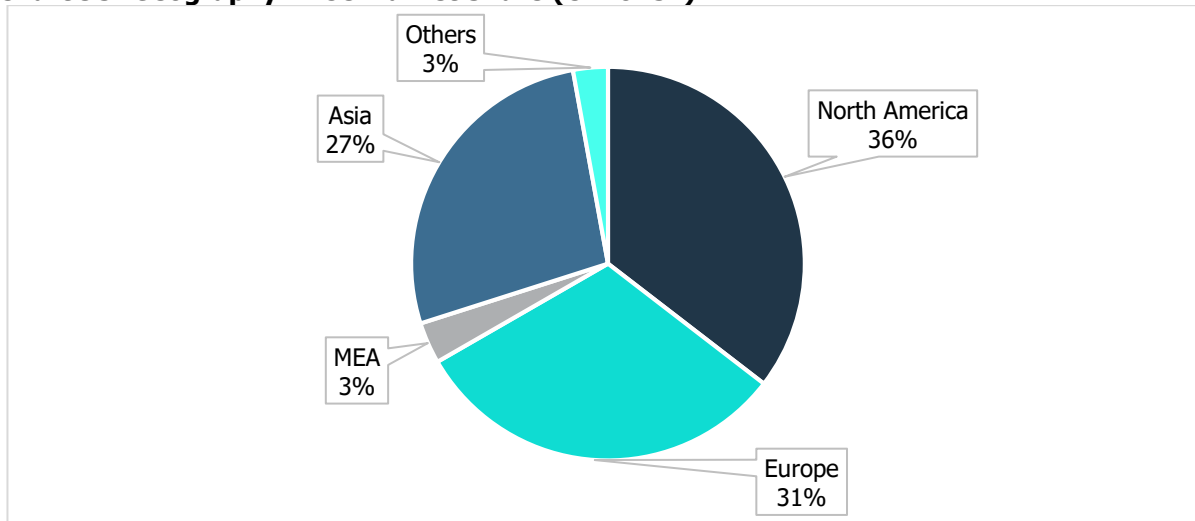
Chart 94: Geographic Break-Down of Global Glycinate Industry (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F - Forecasted

Chart 95: Geography-Wise Market Share (CY2025F)



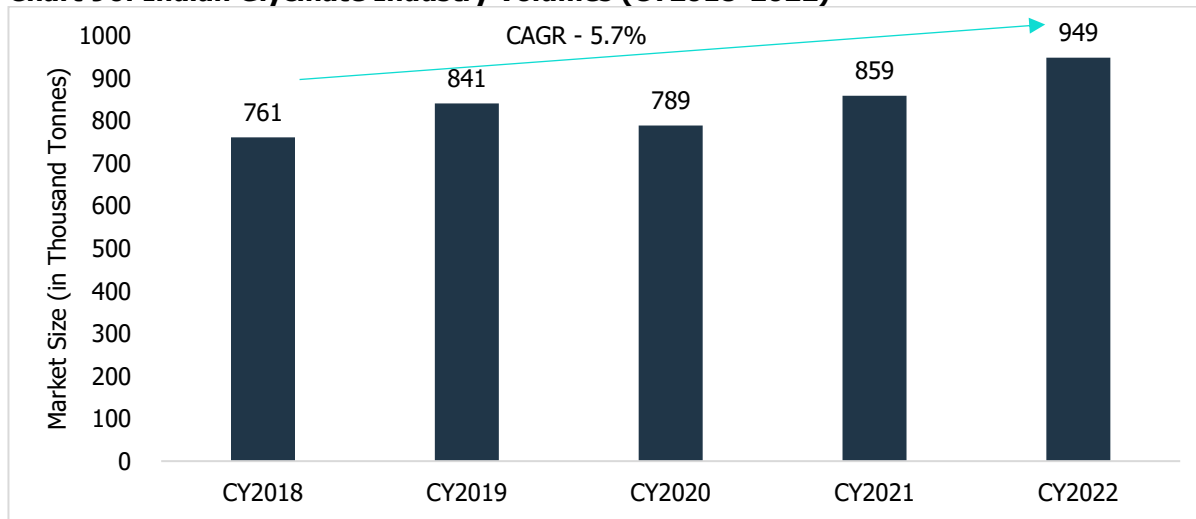
Source: Maia Research, CAREEDGE Research
Note: F - Forecasted

9.4 Indian Glycinate Industry

9.4.1 Volume

The Indian glycinate industry volumes grew at a CAGR of 5.7% from 761 thousand tonnes in CY2018 to 949 thousand tonnes in CY2022.

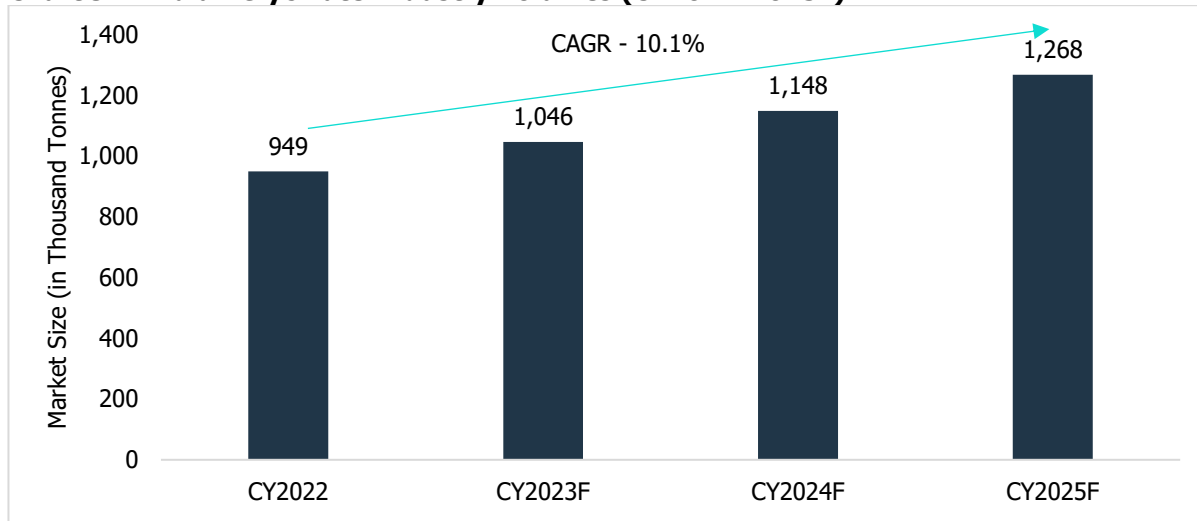
Chart 96: Indian Glycinate Industry Volumes (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The Indian glycinate industry volumes are expected to grow from 949 thousand tonnes in CY2018 to 1,268 thousand tonnes in CY2025, at a CAGR of 10.1%.

Chart 97: Indian Glycinate Industry Volumes (CY2022-2025F)



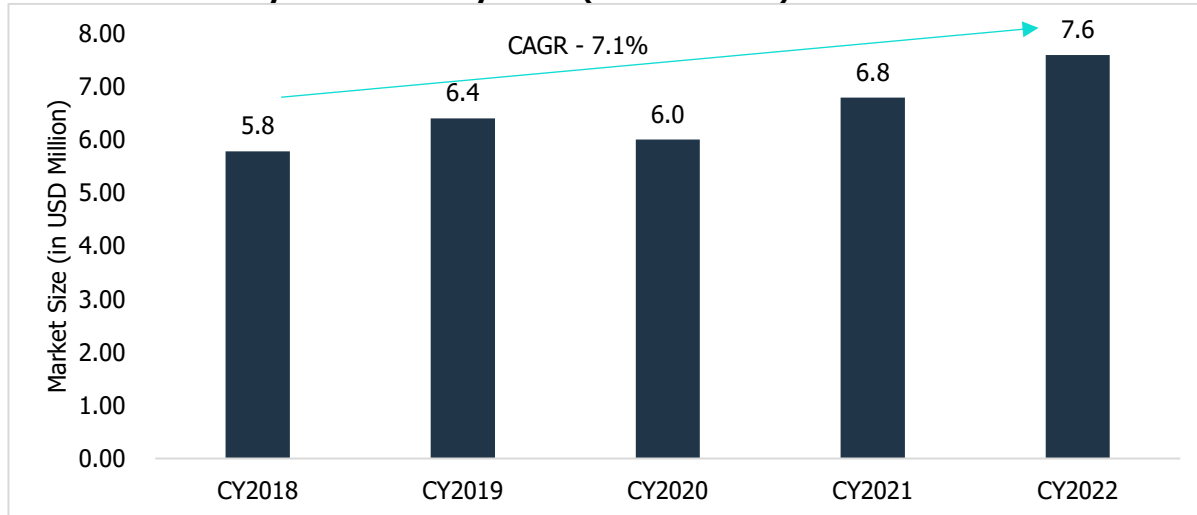
Source: Maia Research, CAREEDGE Research

Note: F- Forecast

9.4.2 Value

The Indian Glycinate industry grew from USD 5.8 million in CY2018 to USD 7.6 million in CY2022, implying a CAGR of 7.1%.

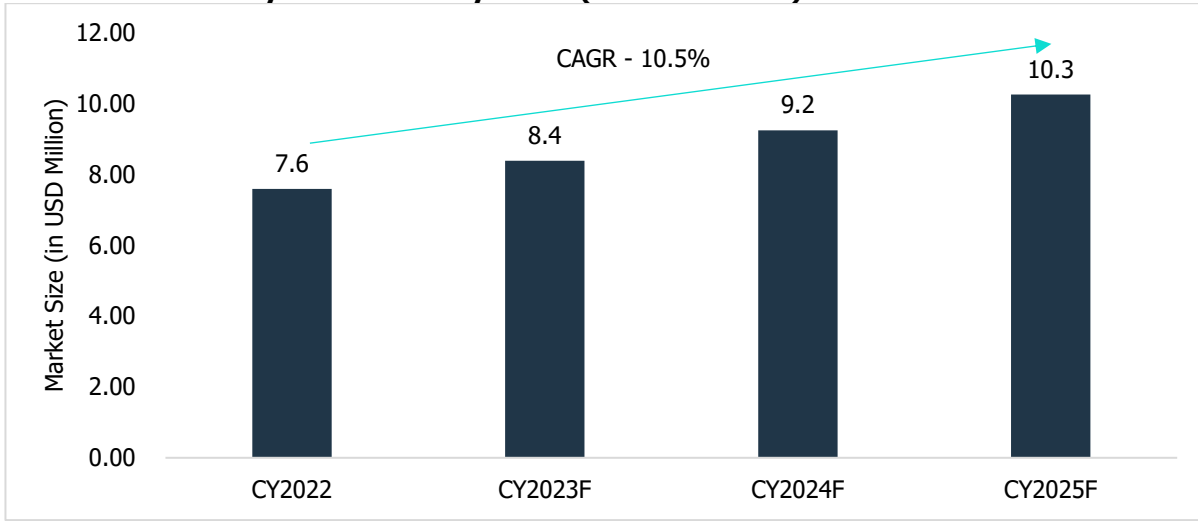
Chart 98: Indian Glycinate Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The Indian glycinate industry is expected to grow from USD 7.6 million in CY2022 to USD 10.3 million in CY2025, implying a CAGR of 10.5%, driven primarily by volume growth.

Chart 99: Indian Glycinate Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F- Forecast

10. Global EDTA Derivatives Industry

10.1 Overview

Ethylenediaminetetraacetic acid (EDTA) and its derivatives find use in various applications, including agriculture, pharmaceuticals, food and beverages, and personal care products. These chelating agents serve as essential ingredients for improving product stability and performance.

Table 44: Types of EDTA Derivatives

| Types | Description |
|------------------------------|--|
| Disodium EDTA | Disodium EDTA, a derivative of EDTA, is frequently employed in various products for functions such as preservation, stabilization, and improved foaming. Additionally, it serves as a chelating agent. |
| Calcium Disodium EDTA | Calcium disodium EDTA is a colourless, crystalline powder with no discernible odour but a subtle, mildly salty flavour. It finds extensive application in the food industry, where it serves as both a preservative and a sequestrant. Additionally, this versatile compound is utilized in the textile and paper sectors. Its utility extends to enhancing stability in pharmaceutical items, detergents, shampoos, soaps, agricultural chemical sprays, contact lens cleaners, and cosmetics. Furthermore, it is also used in medical laboratories and dental offices. |
| Tetrasodium EDTA | Tetrasodium EDTA is formed when EDTA is neutralized with four equivalents of sodium hydroxide or an equivalent sodium base. This substance appears as a soluble white solid and in commercial samples. It is frequently found in a hydrated form, such as Na ₄ EDTA.4H ₂ O. Further, Tetrasodium EDTA is used as a preservative in food, a stabilizer in cosmetics and pharmaceuticals, an enhancer in cleaning products, and for various industrial applications due to its ability to control reactions involving metal ions and maintain product quality. |

Source: CAREEDGE Research

Table 45: Application of EDTA Derivatives

| Applications Description | Applications Description |
|--------------------------|--|
| Reagents | In the field of analytical chemistry, EDTA derivatives are commonly used in reagents for complexometric titrations. Their ability to form stable complexes with metal ions makes them preferable for the precise determination of metal concentrations in samples. |
| Pharmaceuticals | EDTA derivatives are utilized as chelating agents in drug formulations to enhance the stability of medications. Chelation can help prevent the degradation of active pharmaceutical ingredients (APIs) and improve their shelf life. This ensures that pharmaceutical products maintain their potency and effectiveness throughout their intended shelf life. |
| Nutraceuticals | In the nutraceutical industry, EDTA derivatives may be used to stabilize formulations containing essential minerals and vitamins. These compounds can help maintain the quality and effectiveness of nutraceutical products, ensuring that consumers receive the intended health benefits. Chelation with EDTA derivatives can also contribute to the bioavailability of minerals, allowing for better absorption in the body. |
| Industrial | EDTA derivatives find widespread use in industrial sectors, including pharmaceuticals, textiles, everyday consumer goods, agriculture, the paper industry, and more. |

| | |
|----------------------|---|
| Food | EDTA derivatives are frequently employed in the food industry as food additives. They serve as preservatives in a variety of food products, preserving both flavour and colour. |
| Veterinary | EDTA derivatives may be used in veterinary medicine, particularly in certain formulations such as ointments or solutions. They can serve as stabilizers or preservatives in certain veterinary pharmaceutical products. |
| Biotechnology | In biotechnology, EDTA and its derivatives are used as chelating agents in cell culture media to prevent metal ion contamination and maintain the stability of essential nutrients. They are also employed in various laboratory techniques such as DNA and RNA extraction. |
| Metallurgy | EDTA and its derivatives find application in metallurgy as chelating agents to sequester metal ions and prevent their interference in certain processes. They may be used in metal cleaning, metal plating, and other metallurgical applications. |
| Electronics | In the electronics industry, EDTA derivatives can be used in the formulation of cleaning agents for electronic components. They help in chelating metal ions and removing contaminants from surfaces during the manufacturing process. |
| Personal Care | EDTA derivatives are used in personal care products, such as shampoos, conditioners, and skincare formulations. They act as stabilizers, preventing the deterioration of the product due to the presence of metal ions. |

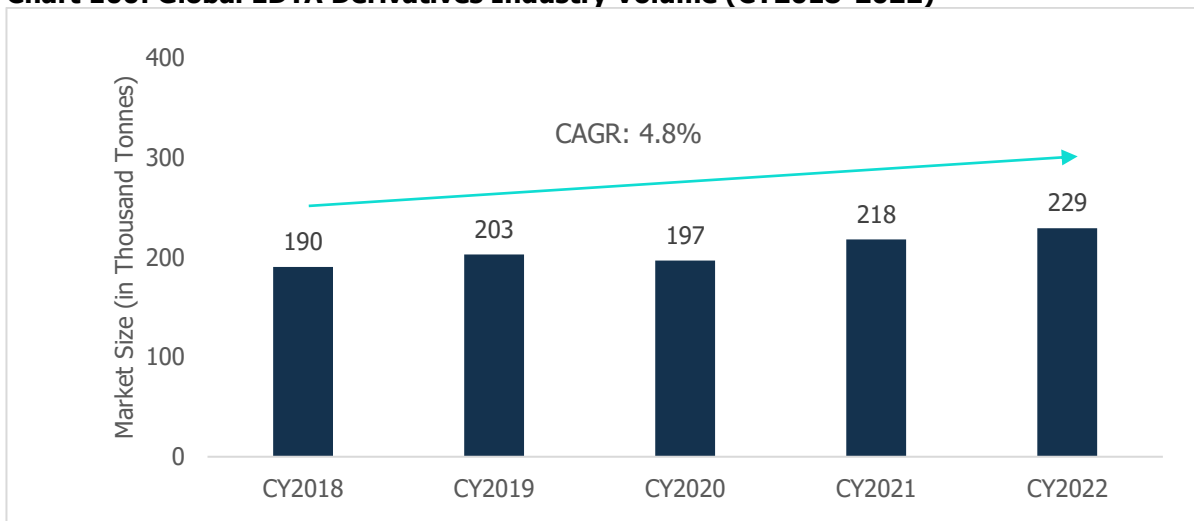
Source: CAREEDGE Research

10.2 Global EDTA Derivatives Industry – Market Size

10.2.1 Volume

The global EDTA derivatives industry volumes have grown at a CAGR of 4.8% from 190 thousand tonnes in CY2018 to 229 thousand tonnes in CY2022.

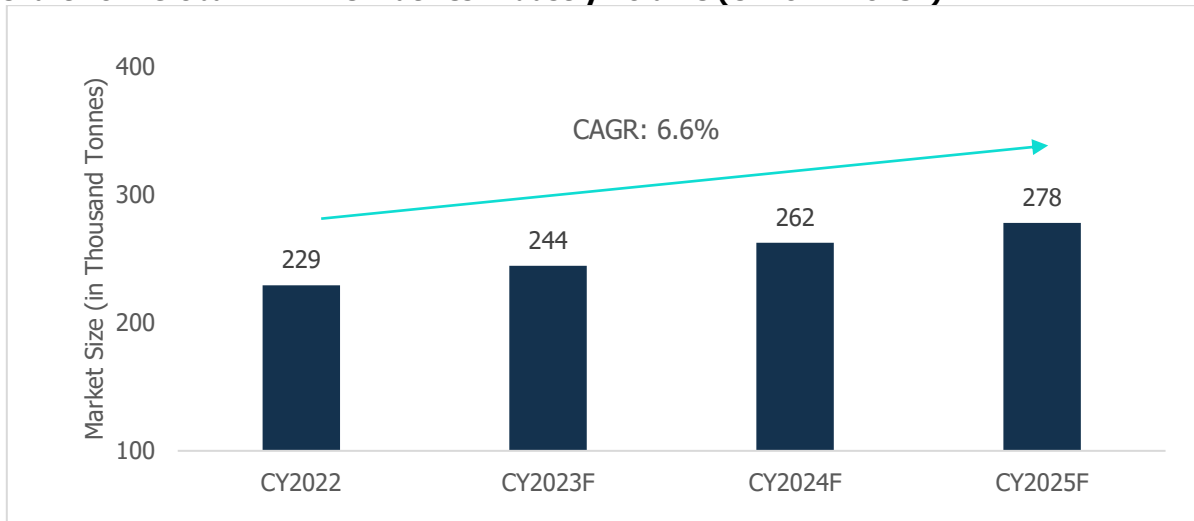
Chart 100: Global EDTA Derivatives Industry Volume (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The volumes are expected to increase from 229 thousand tonnes in CY2022 to 278 thousand tonnes in CY2025, at a CAGR of 6.6%.

Chart 101: Global EDTA Derivatives Industry Volume (CY2022-2025F)

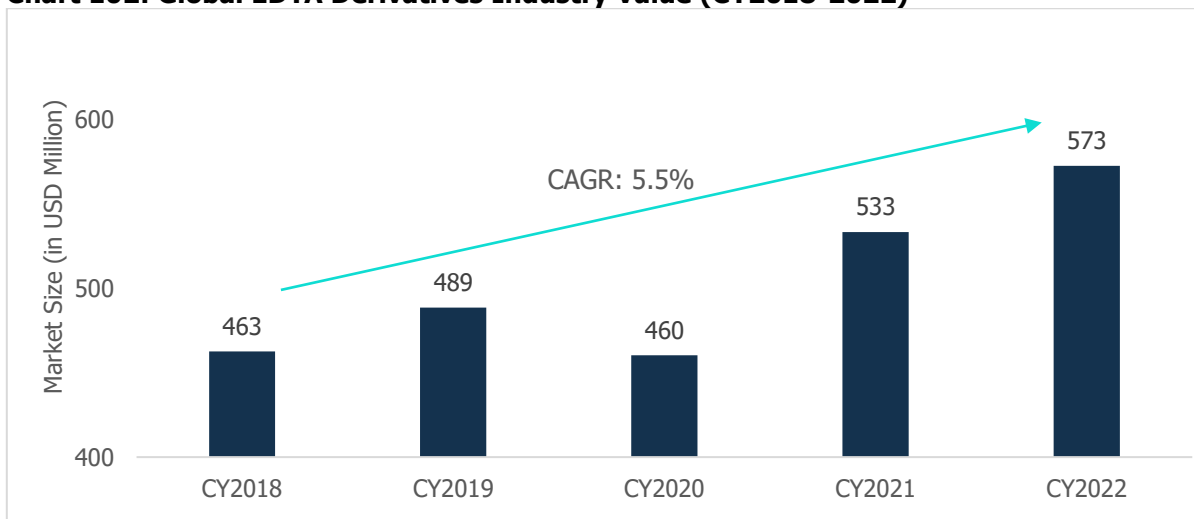


Source: Maia Research, CAREEDGE Research
Note: F: Forecast

10.2.2 Value

The global EDTA derivatives industry has witnessed CAGR of 5.5% in value terms over past five years growing from USD 463 million in CY2018 to USD 573 million in CY2022.

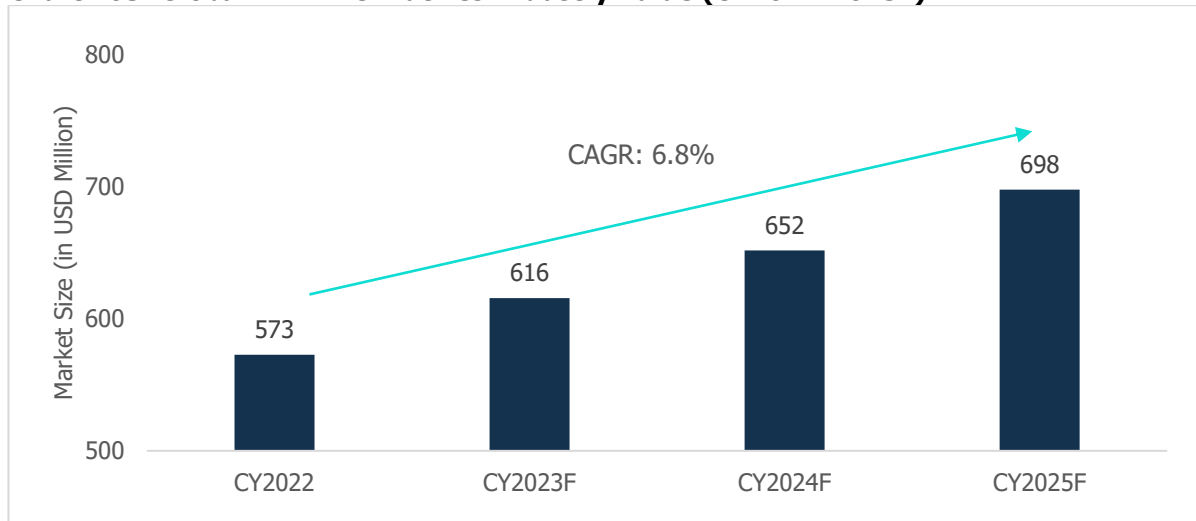
Chart 102: Global EDTA Derivatives Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The global EDTA derivatives industry is expected to grow from USD 573 million in CY2022 to reach USD 698 million by CY2025, representing a CAGR of 6.8%.

Chart 103: Global EDTA Derivatives Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F: Forecast

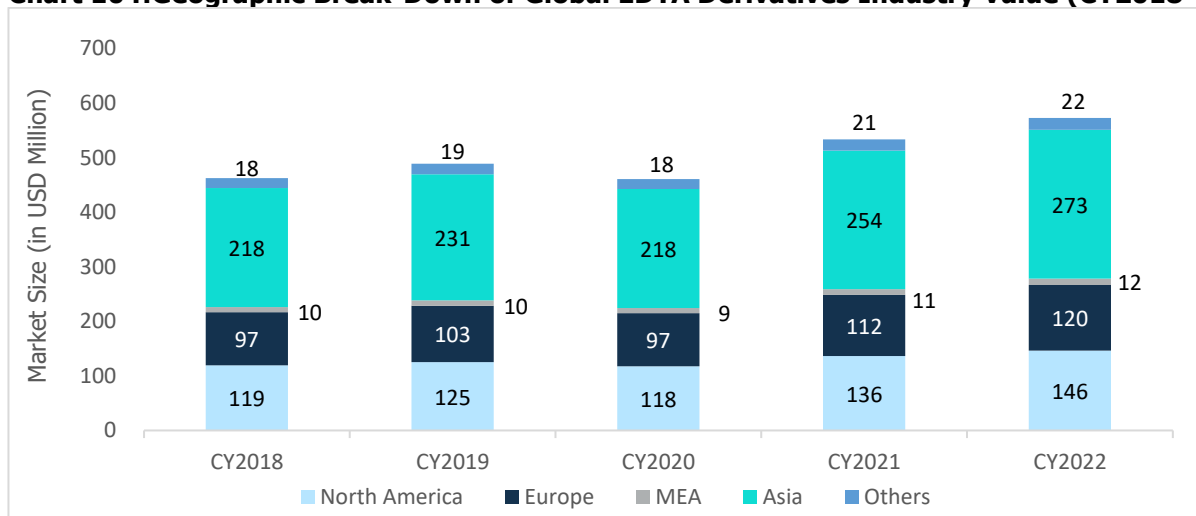
10.3 Break-Up of Global EDTA Derivatives Industry Value by Geography

Asia is the largest market of EDTA derivatives, accounting for 48% of the global market share in CY2022. The region’s consumption has grown at a CAGR of 5.8% from CY2018 to CY2022.

North America is the second-largest market for EDTA derivatives, with 25% of the global market share in CY2022. The region’s consumption has grown at a CAGR of 5.3% from CY2018 to CY2022.

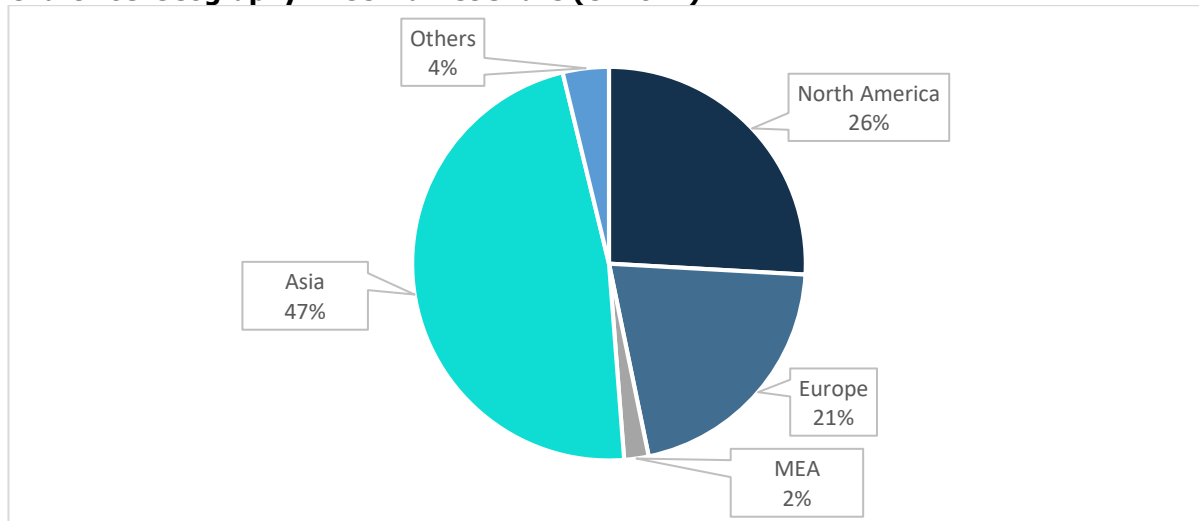
The European region was the world's third-largest market for EDTA derivatives in CY2022, with a global market share of 21%. This region’s consumption has grown at a CAGR of 5.4% from CY2018 to CY2022.

Chart 104:Geographic Break-Down of Global EDTA Derivatives Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

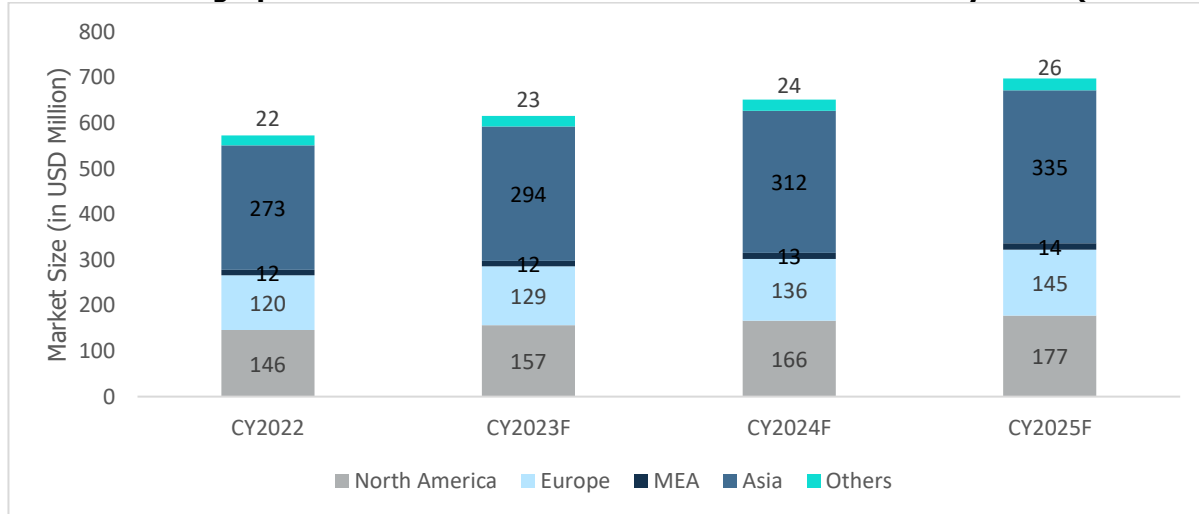
Chart 105: Geography-Wise Market Share (CY2022)



Source: Maia Research, CAREEDGE Research

Asia is expected to remain the largest market for EDTA derivatives with an expected contribution of around 48% by CY2025.

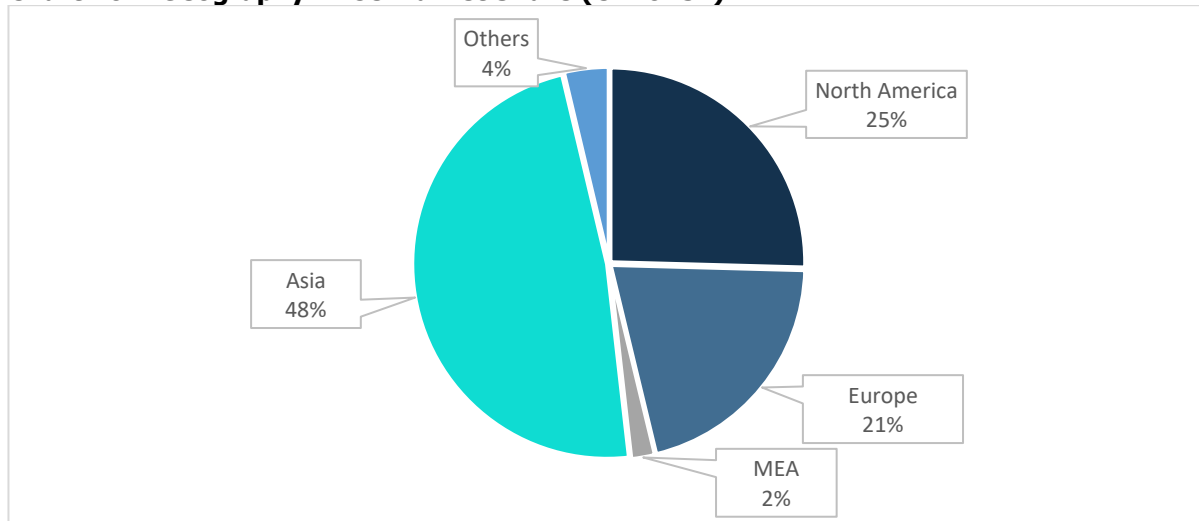
Chart 106: Geographic Break-Down of Global EDTA Derivatives Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F: Forecast

Chart 107: Geography-Wise Market Share (CY2025F)



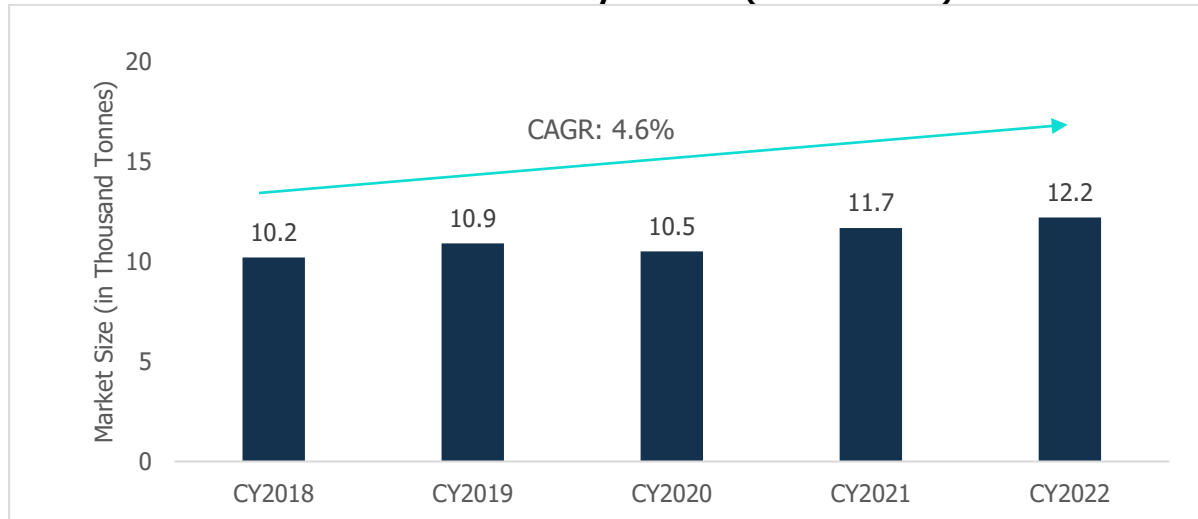
Source: Maia Research, CAREEDGE Research

10.4 Indian EDTA Derivatives Industry

10.4.1 Volume

The Indian EDTA derivative industry’s volumes have grown from 10.2 thousand tonnes in CY2018 to 12.2 thousand tonnes in CY2022, at a CAGR of 4.6%.

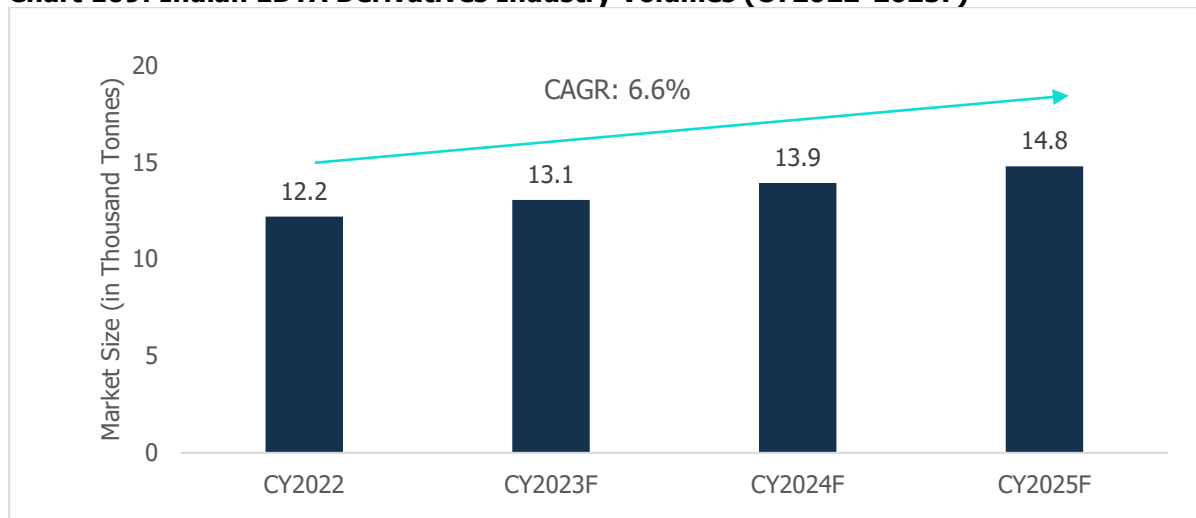
Chart 108: Indian EDTA Derivatives Industry Volumes (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The Indian EDTA derivative industry’s volumes are expected to grow from 12.2 thousand tonnes in CY2022 to 14.8 thousand tonnes in CY2025, at a CAGR of 4.6%.

Chart 109: Indian EDTA Derivatives Industry Volumes (CY2022-2025F)



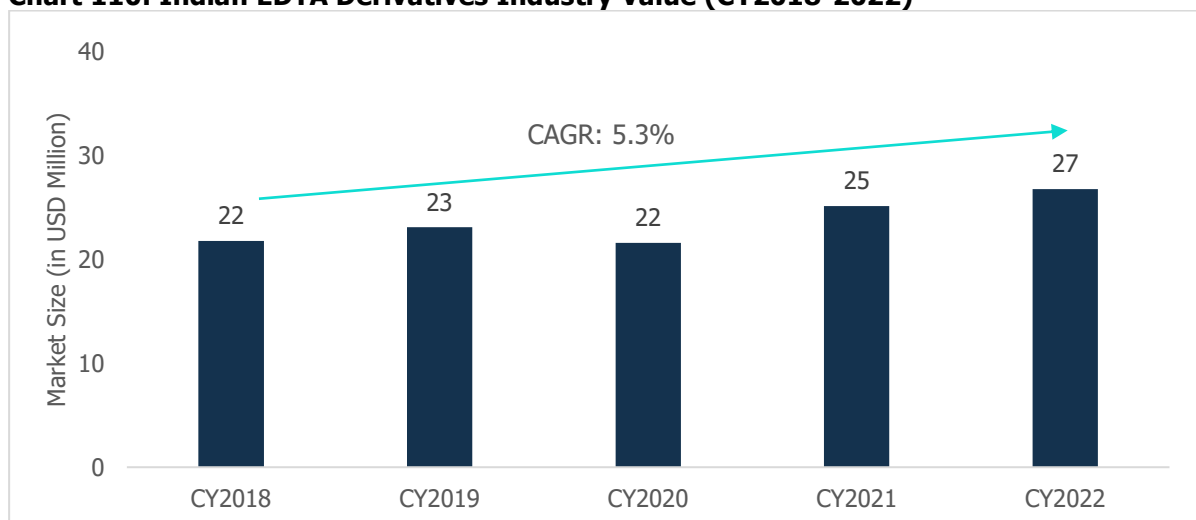
Source: Maia Research, CAREEDGE Research

Note: F: Forecast

10.4.2 Value

The Indian EDTA derivatives industry has grown at a CAGR of 5.3% in value terms from USD 22 million in CY2018 to USD 27 million in CY2022.

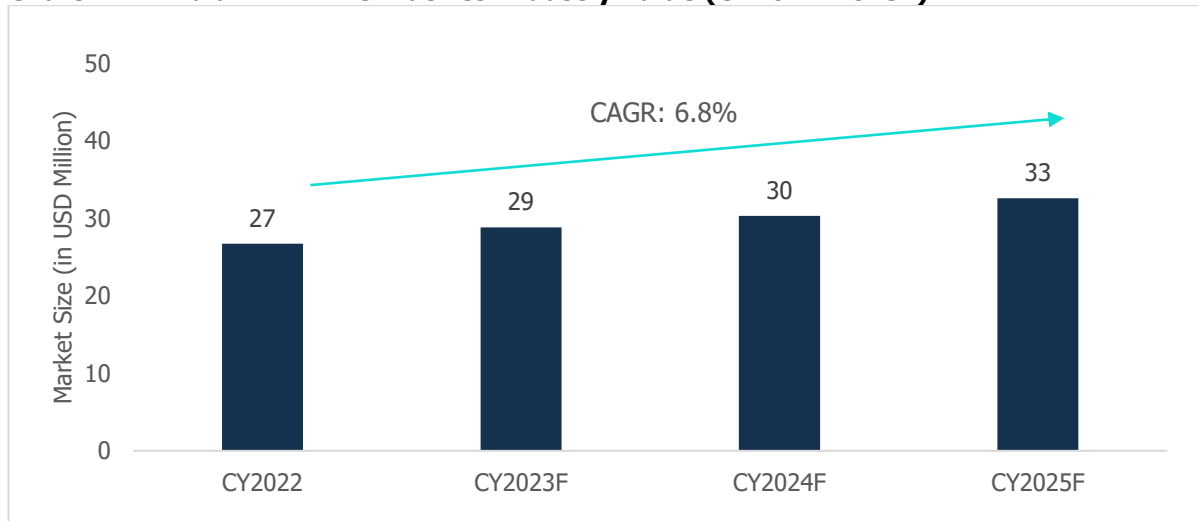
Chart 110: Indian EDTA Derivatives Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The Indian EDTA derivatives industry is expected to experience a revenue growth from USD 27 million in CY2022 to USD 33 million in CY2025, at a CAGR of approximately 6.8%.

Chart 111: Indian EDTA Derivatives Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F: Forecast

11. Global Succinates Industry

11.1 Overview

Succinates are salts or esters of succinic acid. Succinic acid is a dicarboxylic acid with the chemical formula $(\text{CH}_2)_2(\text{CO}_2\text{H})_2$. It is a white, odourless solid with a highly acidic taste. Succinates are commonly used in the pharmaceutical and food applications. They are also used as chemical intermediates and in the production of polymers, clothing fibres, plasticizers, solvents, paints, inks, food & feed additives, pharmaceuticals, perfumes, and an array of industrial and consumer products.

Table 46: Types of Succinates

| Types | Description |
|----------------------------|---|
| Sodium Succinate | Sodium succinate is used as an acidulant and flavouring agent for foods and as a protective coating for fruits and vegetables. Disodium succinates are used as a flavour enhancer to improve the taste of seafood in food. They are also used for pharmaceutical applications such as for treatment of cataracts, conditions such as arthritis, blood disorders, severe allergic reactions etc. |
| Potassium Succinate | Potassium succinate is a potassium salt of succinic acid. In the food industry, it is used as a sequestrant as well as a buffer and neutralizing agent. It is also used in pharmaceuticals due to its anti-inflammatory properties. |
| Manganese Succinate | Manganese succinate is used in pharmacology, medicine, veterinary science, and the food and chemical industries as a medical drug and a biologically active additive and reagent in various kinds of synthesis. |
| Zinc Succinate | Zinc succinates are most commonly used as a nutritional food supplement. |
| Magnesium Succinate | Magnesium succinate finds applications in the pharmaceutical industry for the treatment of primary and secondary hypermagnesemia, as well as severe hypomagnesemia. It is also a source of magnesium in dietary supplements. |

Source: CAREEDGE Research

Table 47: Application of Succinates

| Applications | Description |
|------------------------|---|
| Pharmaceuticals | Drugs involving succinates include metoprolol succinate, sumatriptan succinate, doxylamine succinate or solifenacin succinate, etc. |
| Reagent | Succinates as a reagent are used for the regulation of acidity and as industrial biotechnology raw material. Succinates are also used as foaming agents, ion chelators etc. |
| Nutraceuticals | Succinates have various nutraceutical applications due to their properties of stimulating neural system recovery and improving the immune system. Zinc succinates are used as a supplement of zinc and succinic acid. |
| Food Industry | Disodium succinate is a flavour enhancer widely used in savoury foods. It delivers a unique seafood flavour and can boost the umami flavour when blended with other savoury ingredients. |
| Biotechnology | Electrolysis of aqueous sodium succinate leads to the formation of ethene at the anode along with hydrogen, which can be used for the production of plastic production. |
| Personal Care | Succinic acid can be used in personal care products for curing fine lines, boosting hydration and promoting overall skin health. |

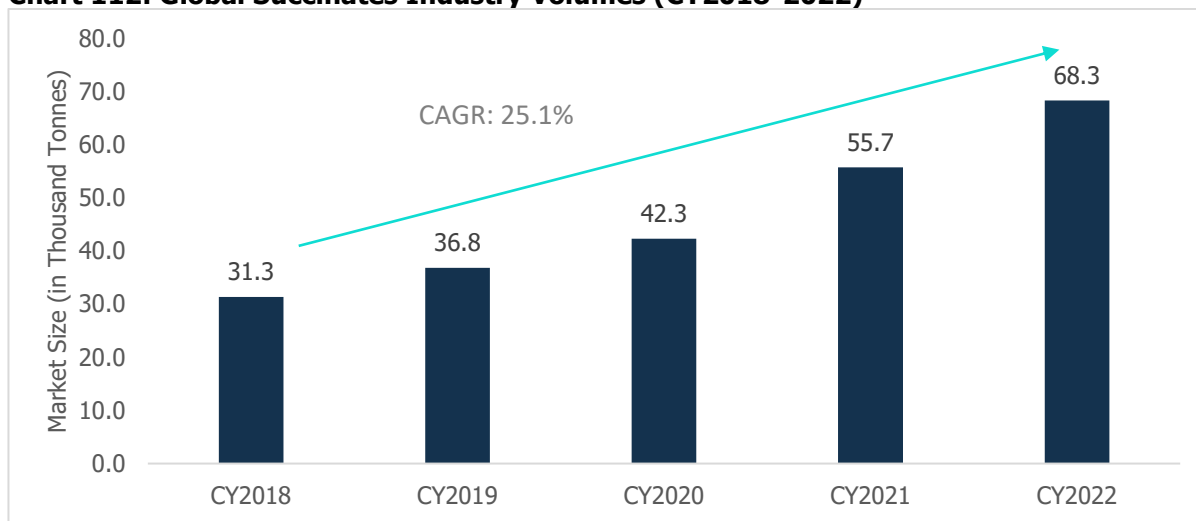
Source: CAREEDGE Research

11.2 Global Succinates Industry – Market Size

11.2.1 Volume

The global succinates industry volumes grew at a CAGR of 25.1% from 31.3 thousand tonnes in CY2018 to 68.3 thousand tonnes in CY2022.

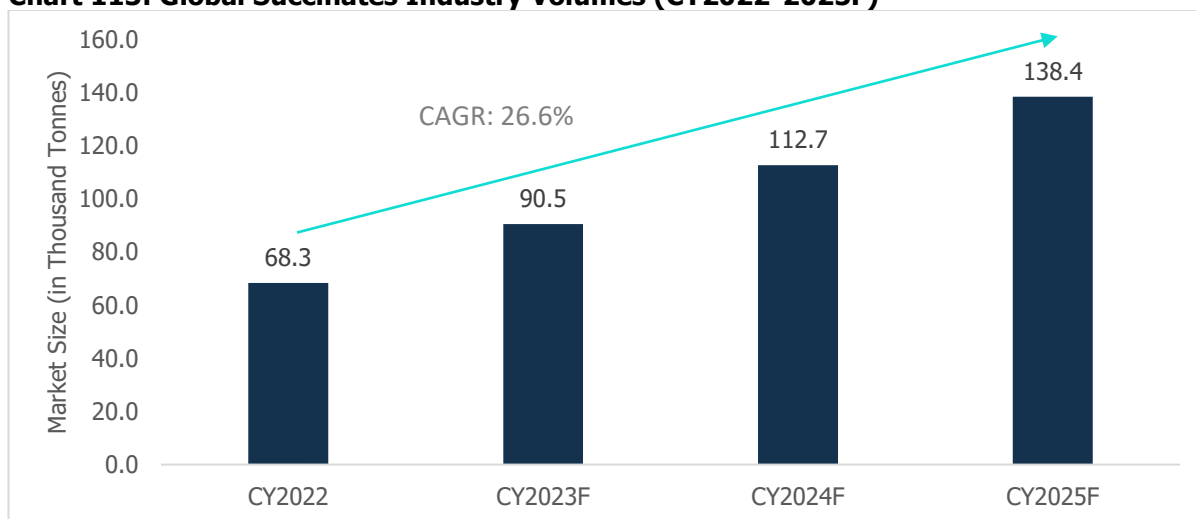
Chart 112: Global Succinates Industry Volumes (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The global succinates industry volumes are expected to grow from 68.3 thousand tonnes in CY2022 to 138.4 thousand tonnes in CY2025, at a CAGR of 26.6%.

Chart 113: Global Succinates Industry Volumes (CY2022-2025F)



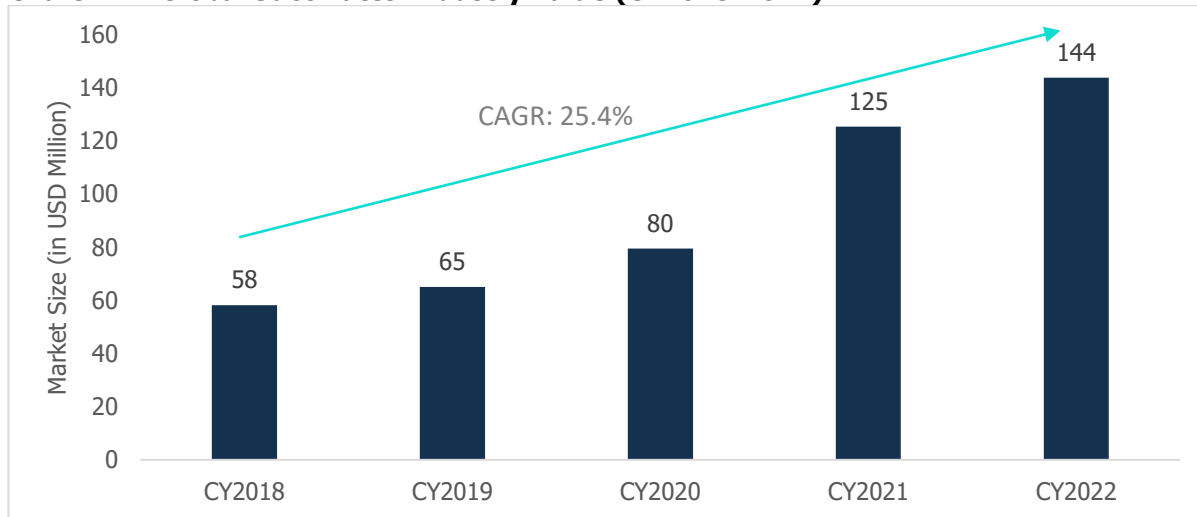
Source: Maia Research, CAREEDGE Research

Note: F: Forecast

11.2.2 Value

The global succinates market size grew at a CAGR of 25.4% in value terms from USD 58 million in CY2018 to USD 144 million in CY2022.

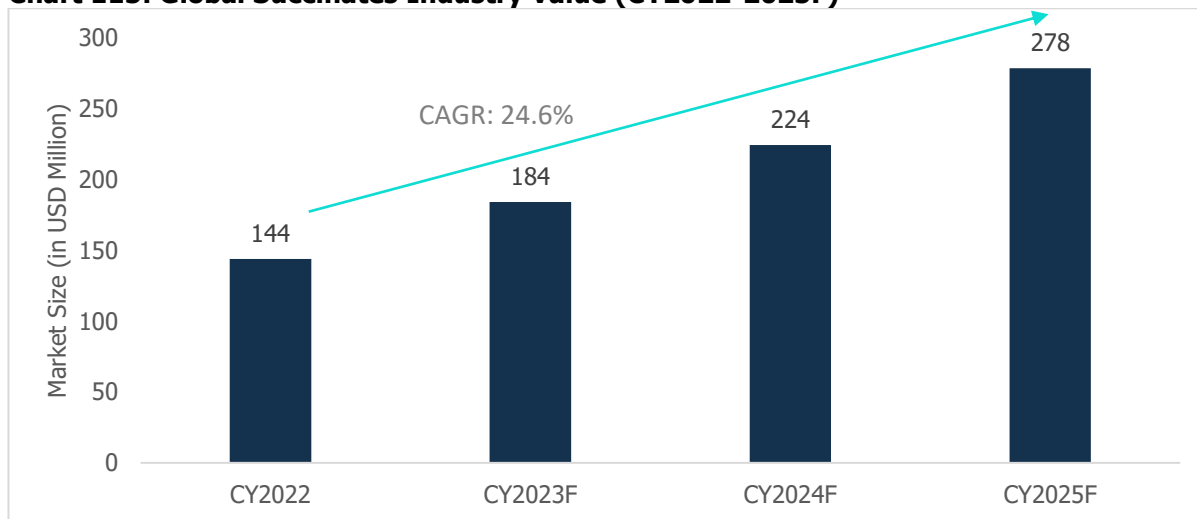
Chart 114: Global Succinates Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The global succinates industry is expected to grow at a CAGR of 24.6% during CY2022-CY2025 to reach USD 278 million by CY2025.

Chart 115: Global Succinates Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F: Forecast

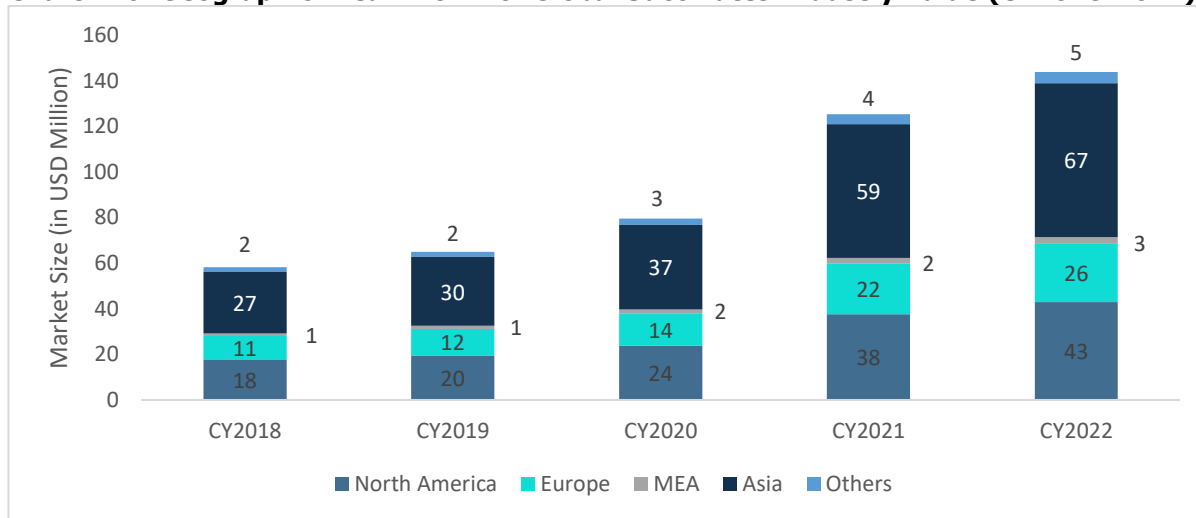
11.3 Break-Up of Global Succinate Industry Value by Geography

Asia is the largest-consuming market for succinates accounting for 47% of global consumption in value terms in CY2022. The consumption of this region has grown at a CAGR of 25.8% over the past 5 years (CY2018-22).

North America is the second-largest consuming market with a share of 30% in CY2022. The consumption of succinates in North America has projected a CAGR of 25.2% over CY2018-22.

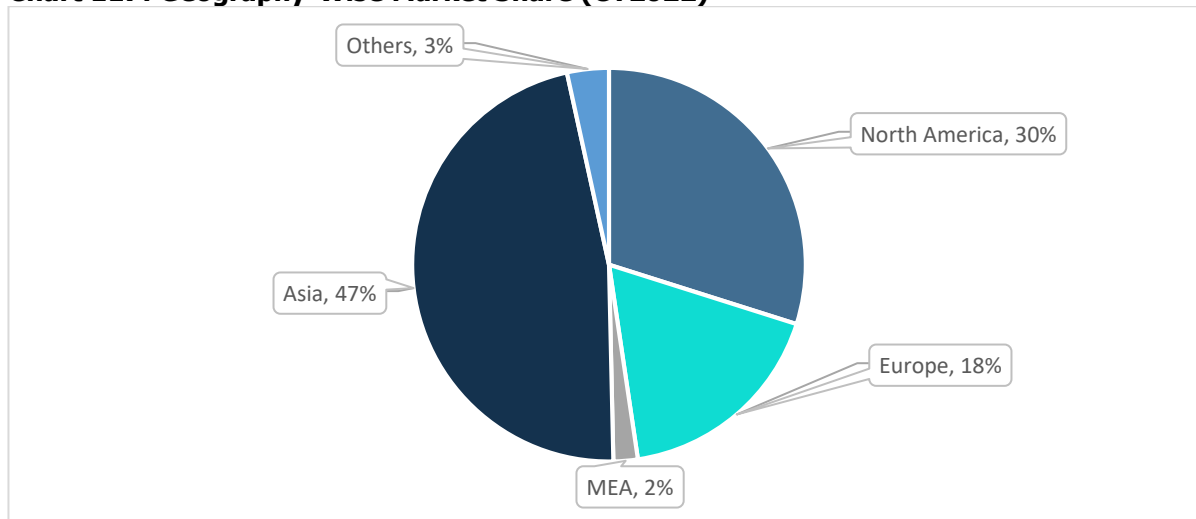
Europe is the third-largest succinates consuming market with a share of 18% in CY2022. The consumption in this region has grown at a CAGR of 24.9% in the past five years.

Chart 116: Geographic Break-Down of Global Succinates Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

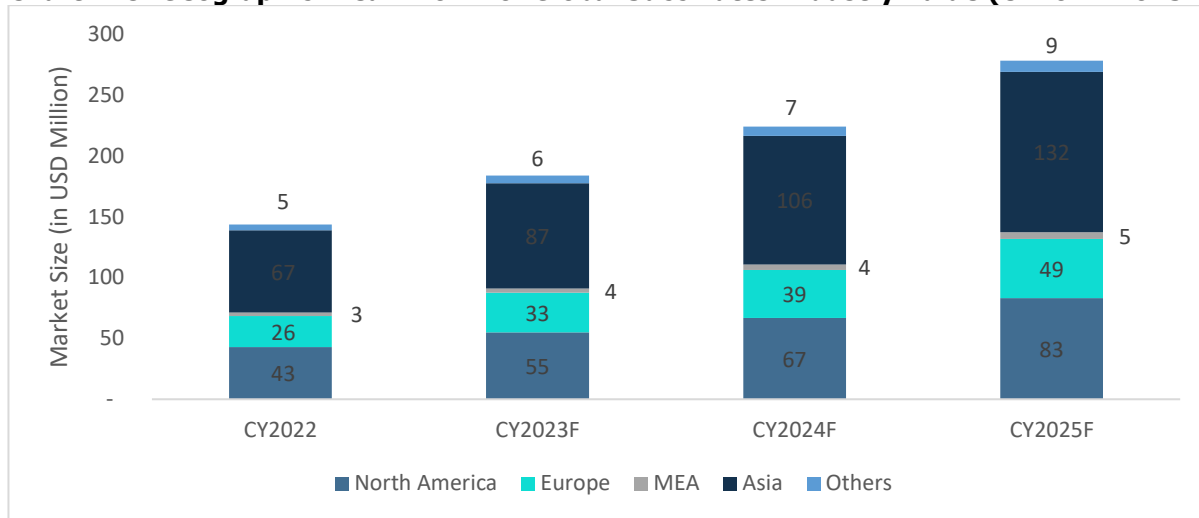
Chart 117: Geography-Wise Market Share (CY2022)



Source: Maia Research, CAREEDGE Research

Asia is expected to remain the largest-consuming market in the global succinates industry, with an expected market share of 47% in CY2025, followed by North America and Europe.

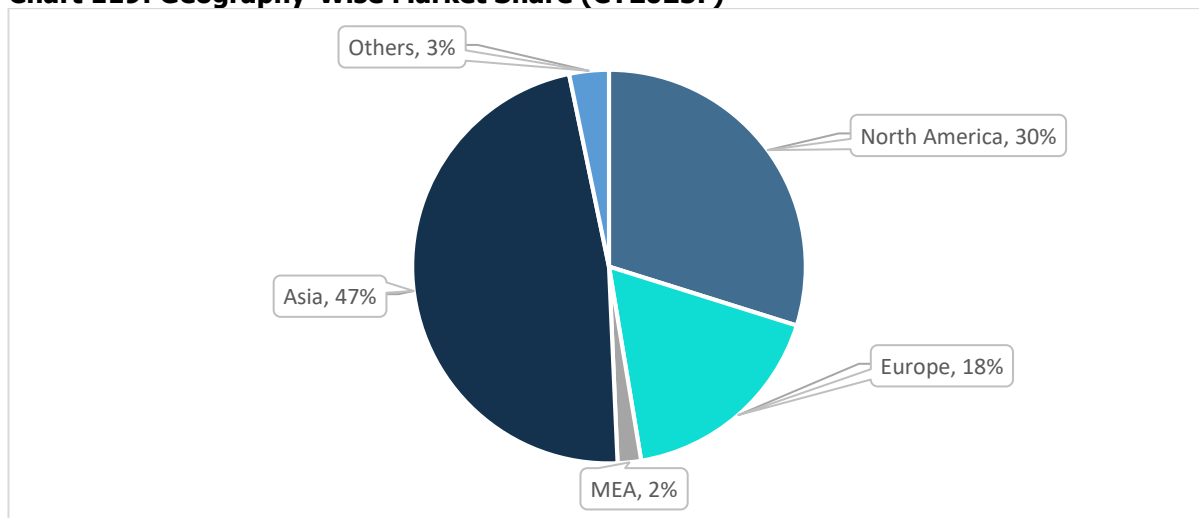
Chart 118: Geographic Break-Down of Global Succinates Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F: Forecast

Chart 119: Geography-Wise Market Share (CY2025F)



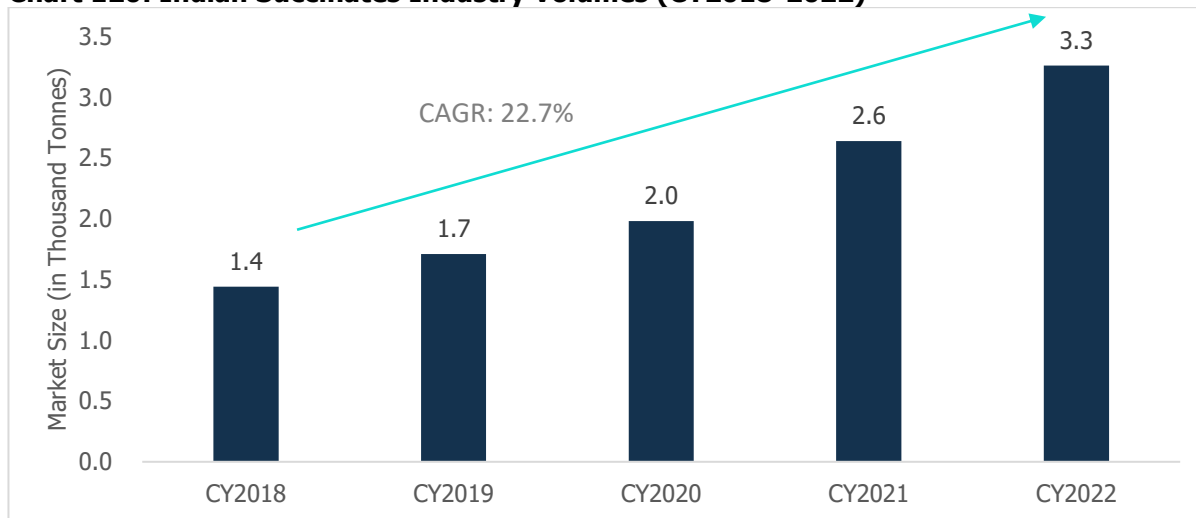
Source: Maia Research, CAREEDGE Research

11.4 Indian Succinates Industry

11.4.1 Volume

Indian succinates industry volumes grew at a CAGR of 22.7% from 1.4 thousand tonnes in CY2018 to 3.3 thousand tonnes in CY2022.

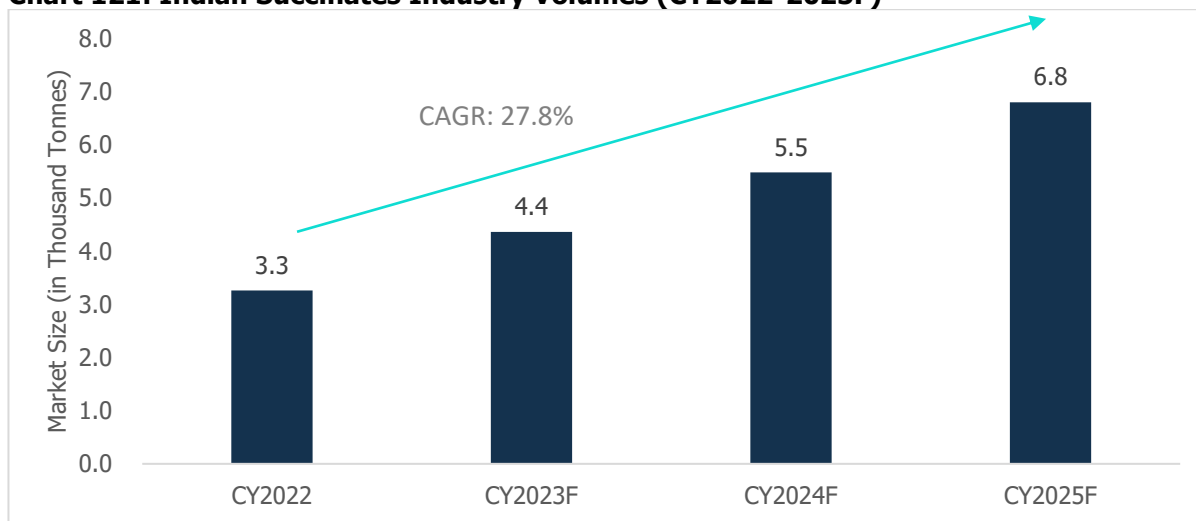
Chart 120: Indian Succinates Industry Volumes (CY2018-2022)



Source: Maia Research, CAREEDGE Research

Indian succinates industry volumes are expected to grow from 3.3 thousand tonnes in CY2022 to 6.8 thousand tonnes in CY2025, at a CAGR of 27.8%.

Chart 121: Indian Succinates Industry Volumes (CY2022-2025F)



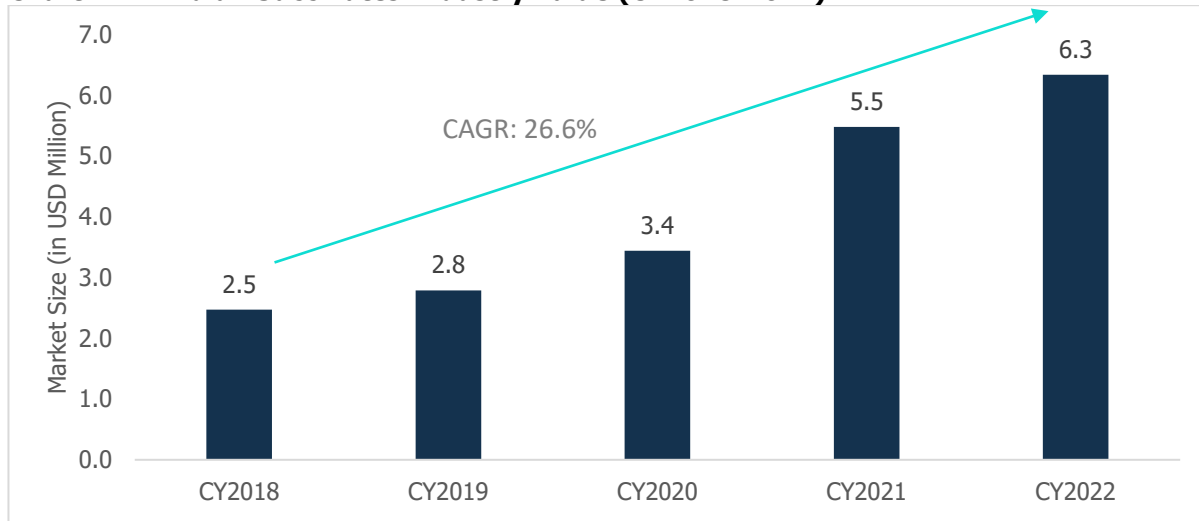
Source: Maia Research, CAREEDGE Research

Note: F: Forecast

11.4.2 Value

The Indian succinates industry has grown at a CAGR of 26.6% in value terms over the past five years from USD 2.5 million in CY2018 to USD 6.3 million in CY2022.

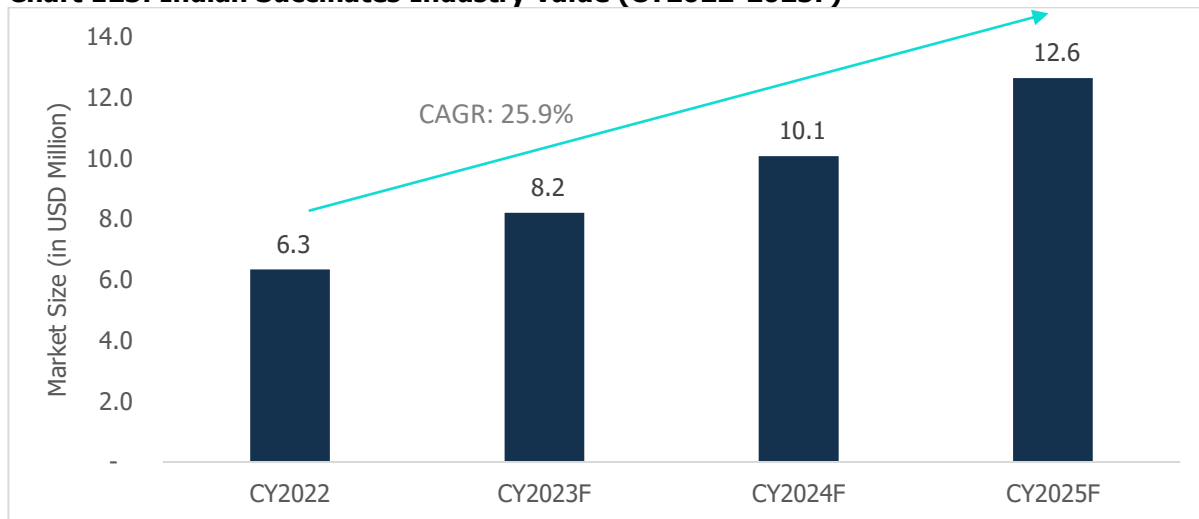
Chart 122: Indian Succinates Industry Value (CY2018-2022)



Source: Maia Research, CAREEDGE Research

The Indian succinates industry is expected to double from USD 6.3 million in CY2022 to USD 12.6 million in CY2025, implying a CAGR of 25.9%.

Chart 123: Indian Succinates Industry Value (CY2022-2025F)



Source: Maia Research, CAREEDGE Research

Note: F: Forecast

12. Growth Drivers – Global Industry

The global consumption of the chemicals mentioned in earlier sections will be driven by the growth in the following industries:

Agriculture

The global agriculture industry has witnessed substantial growth, propelled by several key factors. The increasing global population has fueled the demand for agricultural products. Whereas the rising income levels have led to diverse dietary preferences, boosting the demand for meat products and processed foods. While technological advancements, including precision agriculture and biotechnology, have enhanced productivity and sustainability.

Further, investments in research and development have helped address challenges like climate change, fostering innovations and sustainability in agriculture. Integration of agriculture with food processing and retail sectors has also created value and job opportunities. Such factors will continue to contribute to the expansion of global agricultural output.

Pharma

The global pharmaceutical industry has seen remarkable growth due to the growing demand for healthcare services and pharmaceutical products. Particularly the emerging markets with expanding middle-class populations have played a significant role in the industry's growth. Whereas pharmaceutical companies' substantial investments in research and development (R&D) are fueling ongoing innovation and growth.

Additionally, shifting healthcare reimbursement models toward value-based approaches encourages the development of innovative and cost-effective solutions, further boosting industry growth. Moreover, expanding to emerging markets and strategic partnerships with academic institutions and technology companies create new opportunities, accelerating drug developments and commercialization efforts. Such factors will collectively drive the global pharmaceutical industry's upward trajectory.

Active Pharmaceutical Ingredients (API)

The global active pharmaceutical ingredients (API) industry is poised to grow in the coming years driven by the thriving pharmaceutical industry. Further, the emergence of various infectious and chronic disorders is expected to drive demand for APIs for the development of drugs. Further, the rising healthcare penetration in developing countries alongside the increasing income levels, higher per capita healthcare expenditure, and growing government healthcare programmes will augment the demand for APIs.

Nutraceutical/Dietary Supplements

Over the last few years, there has been a notable increase in the usage of nutraceutical and dietary supplements globally. This is attributed to the increasing ageing population, the rising incidence of chronic illnesses and obesity, and the growing appeal of a healthy lifestyle.

Obesity is a major public health challenge globally. It is a major risk factor for a number of chronic diseases. The causes of obesity are complex but are primarily due to an imbalance between energy intake and energy expenditure. This imbalance can be caused by a number of factors, such as unhealthy diets, physical inactivity, genetics, etc. Whereas there are a number of factors contributing to unhealthy lifestyles such as long working hours, sedentary jobs, stress, and unhealthy food choices.

Accordingly, the potential health advantages of dietary supplements and nutraceuticals, such as enhanced immunity, lowered risk of chronic illnesses, and higher energy levels, are becoming more and more known to consumers. Such factors, coupled with rising awareness and affordability, will continue to drive the global demand for nutraceuticals.

Food and Beverages

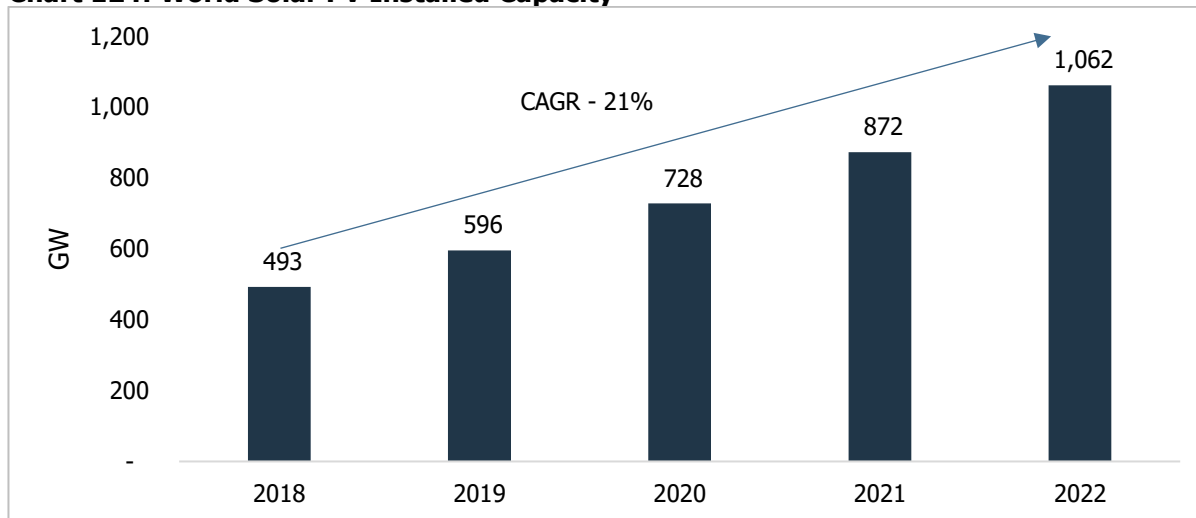
The global food and beverages industry is poised for significant growth driven by the rising global population, the increasing urbanization, and the higher demand for convenient & diverse food options. This demographic shift is fueling the need for more food production and distribution, creating opportunities for food & beverage companies to expand their market reach. Additionally, changing consumer preferences toward healthier, more organic, and more sustainable food choices are prompting industry players to innovate and cater to these demands, further driving growth.

Moreover, the globalization of food trade and the ease of international transportation have opened up new markets and opportunities for food & beverage companies. This is facilitated by trade agreements and technologies that enable efficient supply chains. As consumers become more open to trying international cuisines and products, food & beverage companies can tap into diverse markets and consumer segments, contributing to industry growth. Overall, the food and beverages industry's growth is influenced by population trends, changing consumer preferences, and increased global trade and connectivity.

Solar Power

Solar PV capacity additions expanded at a CAGR of 21% from 483 GW in 2018 to 1,062 GW in 2022. Photovoltaics (PV) has become the most cost-effective choice for energy generation in many nations, particularly those with abundant natural resources and low-cost financing. As a result, businesses are increasingly opting for bilateral agreements with large-scale solar photovoltaic plants to meet their energy needs. PV capacity is also growing due to continued policy support from governments around the world.

Chart 124: World Solar PV Installed Capacity



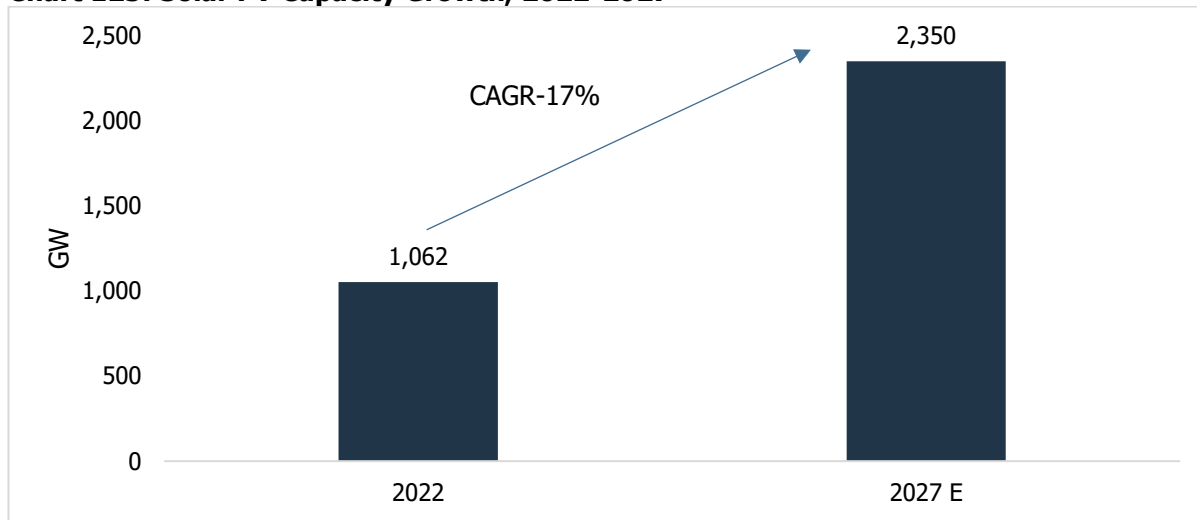
Source: International Renewable Energy Agency (IRENA) Renewable Energy Statistics 2023

Furthermore, the global solar capacity additions are expected to increase significantly over the next five years, propelled by various governments' thrust on reduction in carbon emissions to achieve the targets committed under the Paris Agreement and the UN Climate Change Conference in Glasgow (COP26). Similarly, many governments have implemented policies and initiatives to promote the development of solar energy such as tax credits, subsidies, renewable energy targets, etc.

Moreover, the corporate consumers are becoming increasingly environmentally conscious, thereby increasing the procurement of renewable energy. The capacity additions will be supported by the falling cost of modules which have improved the project economics and minimized funding requirements.

Such factors are expected to increase the global solar capacity by three times over 2022-2027 to 2,350 GW.

Chart 125: Solar PV Capacity Growth, 2022-2027



Source: International Renewable Energy Agency (IRENA), International Energy Agency (IEA)

Agrochemicals

The global agrochemicals industry is expected to witness stable growth in the medium-long term. The current global population is around 8 billion and is expected to reach 9 billion by 2037 as per the United Nations. The constantly growing population is leading to a growing demand for food, which, in turn, will drive the consumption of agrochemicals. Further, increasing requirements for crop protection and productivity-enhancing materials will also lead to higher consumption of agrochemicals. As farmers worldwide increasingly use modern farming techniques, agrochemicals will play a key role in ensuring desired yields.

Biotechnology

Under biotechnology, molecular biology developments are extended to applications for human and animal health, agriculture, the environment, and specialty chemical manufacturing. As biotechnology is a critical industry targeted toward various applications, factors such as increasing incidence of diseases, stressful lifestyles, rising expenditure on research and development, supportive government policies, etc., will drive the growth of the global biotechnology industry in the coming years.

Personal Care

Beauty and personal care continues to be one of the well-performing industries globally and is expected to continue its growth trajectory driven by rising population, growing per capita and disposable income, increasing awareness, growing penetration and availability of personal care products in emerging markets, etc.

Further, personal care product consumption is expected to be driven by new product lines such as male grooming and natural & organic products and an increasing focus on hygiene and appearance. The e-commerce platforms are also acting as significant enablers for the growth in personal care consumption due to the convenience of doorstep delivery, availability of a vast range of products, and competitive pricing.

Animal Health

Animal health products are targeted toward the overall well-being of animals, including preventive healthcare, vaccinations, nutritional supplements, etc. The animal health market will be mainly driven by the rising demand for meat and growing pet ownership.

Further, there has been a significant rise in preventive health care for both pets and livestock to reduce the risk of diseases in future. Accordingly, there is a growing demand for animal health products including vaccinations, nutritional supplements, parasiticides, etc. Further, the technological advancements and R&D in pharmaceuticals and biotechnology focused on animal health are boosting the consumption of animal health products.

Moreover, the pet care market growth is expected to remain healthy driven by increasing focus on the well-being of the pet animals coupled with rising per capita income, which has further enabled pet owners to spend larger amounts on pet healthcare. The pet care market has also seen the advent of new product lines, further contributing to the market growth.

Metallurgy

The global metallurgy market is expected to be driven by increased infrastructure construction and real estate development across countries and the thriving auto industry, which will add to the demand for steel, aluminium, and other metals.

Further, the growing infrastructure construction will be driven by roads, railways, electricity & power, water and sewerage, and airports and other infrastructure. Governments across the globe are increasingly focusing on infrastructure sectors to fuel the domestic economy and become more competitive, which will lead to growth in demand for key metals. The global automobile industry is also expected to exhibit steady growth in the long term despite near-term headwinds due to inflationary trends.

Scientific and Laboratory Research

The continuous innovation in technology such as artificial intelligence (AI), machine learning, and automation has paved the way to revolutionize scientific research. These advancements have increased the efficiency, accuracy, data analysis, and speed of experiments, which has led to significant growth in research capabilities. Whereas the increased demand for healthcare solutions drives research in areas such as medical devices, pharmaceuticals, biotechnology, and personalized medicine.

The continuous innovation in chemical processes has fueled research within the chemical industry and advanced laboratory research is focused on developing new materials, enhancing the properties of chemicals for usage in diverse applications as well as improving manufacturing processes. Also, the demand for chemical research is increasing as there is a growing demand for specialty chemicals used in industries like pharmaceuticals, personal care products, agrochemicals, electronics, etc. Therefore, research in laboratories aims to create high-value specialized chemicals with unique properties, which will help in catering the specific industry needs.

Electronics

The global consumer electronics industry is expected to maintain its growth trajectory fueled by rising disposable income levels, increasing digitization in underpenetrated areas, automation, and rising purchases and replacements of personal electronics devices such as smartphones, laptops etc. The electronics industry saw a rise in demand for devices such as home entertainment and devices to enable remote working during COVID-19. This trend is likely to continue given the revolving hybrid work models. Further, the frequent introduction of new models and upgrades by electronics manufacturers also augurs well for global electronics demand.

Precision Industrial Products

The precision parts market encompasses valves, gears, bearings, connectors, shafts and customized components, which are tailored to specific industry requirements. Industries such as aerospace, automotive, and electronics require

components possessing exceptional precision and quality to ensure optimal performance and safety. Therefore, the increasing focus on precision engineering has driven the demand for precision parts globally. Since industries across the globe are embracing automation to enhance productivity and minimize human errors, precision parts are essential components in automated systems, which aids in driving the demand for advanced and reliable components. Moreover, with the growing demand for miniaturized products across industries, there is a need for precision parts, which can fit into compact devices without compromising performance or functionality.

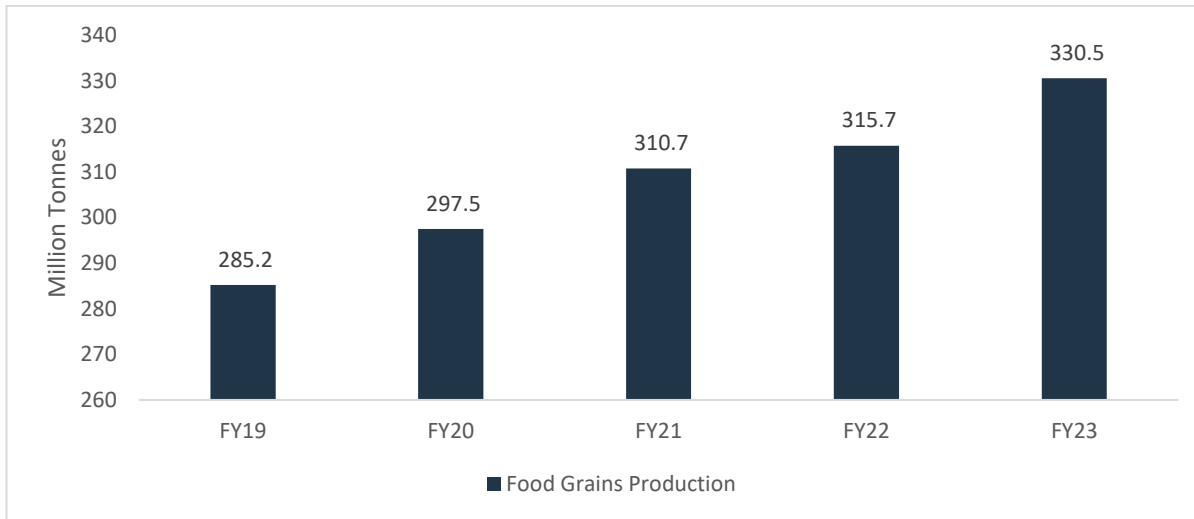
13. Growth Drivers – Indian Industry

The domestic consumption of the chemicals mentioned in earlier sections will be driven by the growth in the following industries:

Agriculture

Food grain production in India has been on the rise. India has witnessed a remarkable surge in the production levels of several key crops, such as rice, wheat, maize, cereals, and lentils. For instance, it has risen from 285.2 MT in FY19 to 330.5 MT in FY23.

Chart 126: Past Trend in Food Grains Production in India



Source: Department of Agriculture and Farmers Welfare, Press Information Bureau

This is accredited to the continually increasing area under cultivation and supplemented by the government’s focus on agro-ecological crop planning, diversification from rice and wheat to oilseeds and pulses, and increase in Minimum Support Prices (MSPs), among others.

Further, the agricultural output of the country is expected to continue its upward trajectory in the medium-long term, driven by the adoption of technologies to improve crop yields such as soil mapping software, geo-location of crop disease, use of drones, hydroponics, etc. The government support for the sector is also expected to continue. The thrust on increasing agricultural output will thus lead to increased demand for pesticides and agrochemicals.

Pharma

The Indian pharmaceutical industry has demonstrated a CAGR of approximately 8% from FY17 to FY23, resulting in a market size of approximately USD 50 billion. This growth is attributed to an 8% CAGR in domestic consumption and a 7% CAGR in exports during the same timeframe.

The domestic demand for pharmaceuticals will be driven by enhanced access to healthcare facilities and the rising per capita income. Further, exports are expected to grow on account of the increasing entry of pharmaceutical firms into untapped markets despite recessionary winds in the developed markets.

The outlook for the exports is healthy driven by increasing demand within both regulated and emerging pharmaceutical markets and the impending expiration of patents on certain drugs. Moreover, India has signed trade agreements with

various countries like Australia and the United Arab Emirates (UAE). UAE is a gateway to exports to the Gulf Cooperation Council (GCC) and African regions, further expanding the reach of Indian drugs. Post the agreement with Australia, the approvals for patented, generic, and biosimilars will be fast-tracked and there will be duty-free access to India's pharmaceuticals. Additionally, the exports are likely to increase, given the production-linked incentive (PLI) for pharmaceuticals announced by the government.

Driven by the above factors, the Indian pharmaceutical market is expected to grow to a market size of approximately USD 57 billion by FY25.

Active Pharmaceutical Ingredient (API)

The active pharmaceutical ingredient (API) segment is pivotal in the pharmaceutical industry, constituting approximately 35% of the market. APIs are biologically active components of drugs responsible for their intended medical effects. India, the third-largest global API producer, commands an 8% share and manufactures 500+ different APIs, contributing 57% to the WHO prequalified list. With a projected CAGR of 13.7% over the next four years as per Invest India, the Indian API market is expected to benefit from a robust domestic market, advanced chemical industry, skilled workforce, and competitive operational costs.

Nutraceutical/ Dietary Supplements

The Indian dietary supplements consumption has grown significantly in the past few years. This is attributable to sedentary & stressful lifestyles, difficulty in maintaining balanced diets due to hectic schedules, deteriorating soil quality, increasing consumption of junk food, etc. Accordingly, the increasing awareness of the benefits of dietary supplements and the penetration of healthcare facilities have led to the emergence of this trend. Furthermore, post-COVID-19, many people have also resorted to consumption of dietary supplements as a preventive measure.

Overall, the consumption of dietary supplements is expected to continue its growth trajectory in India, driven by an expanding consumer base and increasing affordability due to growth in per capita income.

Food and Beverages

Domestic food & beverage consumption is on the rise, driven by the rising population, the increasing per capita income, and consumer spending. The Indian F&B industry is expected to witness robust growth in the near-medium term supplemented by a young population, rising consumer spending, growing penetration of restaurants, Quick Service Restaurants (QSRs) in Tier 2 and Tier 3 cities, and the advent of user-friendly delivery apps and tech-enabled networks. Furthermore, the increasing tendency to dine out in India's cities among all economic classes, and not restricting dining out to special occasions, will further support the industry.

Moreover, India is becoming a leading sourcing hub for processed food led by a strong agricultural sector, availability of life-stock, and low-cost structure. These factors are expected to boost exports of processed food.

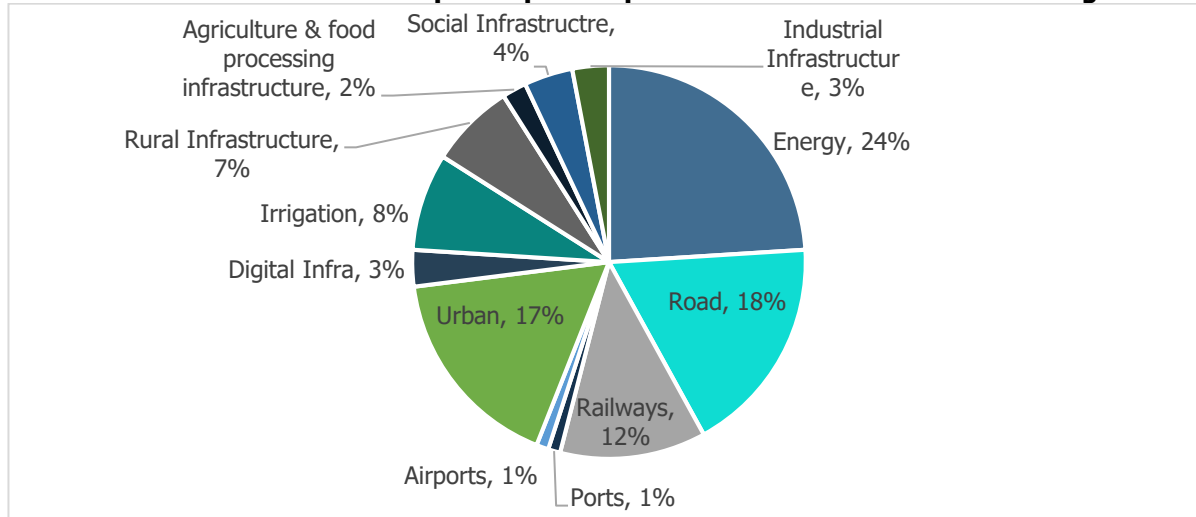
Construction

The construction sector in India is expected to witness robust growth driven by the following factors:

Continued Government Spending - Over the long term, the outlook for the construction sector is favourable, supported by continued government spending on infrastructure. Before the onset of the pandemic, the GoI had unveiled the National Infrastructure Policy (NIP) covering various sectors and regions indicating that it is relying on an 'infrastructure creation' led revival of the country's economy. The NIP which covered rural and urban infrastructure entailed investments to the tune of Rs. 111 Trillion to be undertaken by the Central Government, State Governments and the private sector during FY20-25.

In order to achieve the GDP of USD 5 trillion by FY25, India needs to spend about USD 1.4 trillion over these years on infrastructure. During FYs 2008-17, India invested about USD 1.1 trillion on infrastructure. However, the challenge is to step up infrastructure investment substantially. Keeping this objective in view, NIP was launched with projected infrastructure investment of around ₹111 Trillion (USD 1.5 trillion) during FY 2020-2025 to provide world-class infrastructure across the country, and improve the quality of life for all citizens. It also envisages to improve project preparation and attract investment, both domestic and foreign in infrastructure. NIP was launched with 6,835 projects, which has expanded to over 9,000 projects covering 34 infrastructure sub-sectors.

Chart 127: Sector-wise break-up of capital expenditure of Rs. 111 Trillion during FY2020-25



Source: NIP

During the fiscals 2020 to 2025, sectors such as energy (24%), roads (18%), urban (17%), and railways (12%) amount to around 70% of the projected capital expenditure in infrastructure in India. NIP has involved all the stakeholders for a coordinated approach to infrastructure creation in India to boost short-term as well as the potential GDP growth.

Further, the number of projects and the total cost as per NIP for different sectors are as follows:

Table 48: Sector-wise Projects and Cost Under NIP

| Sector | No. of projects | Value of projects (USD Billion) |
|--|-----------------|---------------------------------|
| Roads & bridges | 3,595 | 396.23 |
| Railways | 752 | 243.99 |
| Power (Generation, Transmission & Distribution) | 697 | 364.27 |
| Real Estate | 630 | 225.09 |
| Waste and Water | 940 | 119.67 |
| Urban public transport (Metro, bus terminal, road/traffic infra etc) | 216 | 98.39 |

Source: NIP

- Growth in Road Construction** - Road construction in India is expected to grow with new funding mechanisms by NHAI, such as ToT (Toll Operate Transfer) and InvITs (Infrastructure Investment Trust) and interest from international funds (both for equity as well as debt).
- Strengthening Real Estate Developments** - Real Estate has the potential to catapult India to the third-largest construction market globally. The sector is expected to contribute 15% to the Indian economy by 2030. The recent

policy reforms such as the Real Estate Act, GST, and REITs are steps to reduce approval delays. These reforms will strengthen the real estate and construction sectors.

- Development in Railways** - The Indian government is taking several initiatives to upgrade the ageing railway infrastructure and its quality of service. The upgrades include 100% electrification of railways, upgrading existing lines with more facilities and higher speeds, expansion of new lines, upgrading railway stations, introducing and eventually developing a large high-speed train network interconnecting major cities in different parts of India, and development of various dedicated freight corridors to cut down cargo costs within the country. Such developments augur well for the construction segment growth.

Solar Power

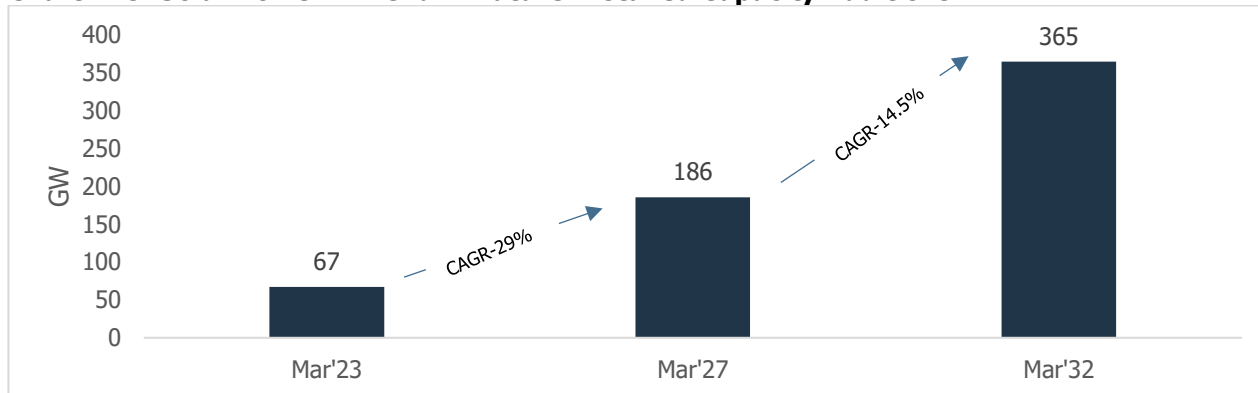
India has a solar potential of 749 GW with an installed capacity of 72 GW as of September 2023. The installed capacity is only around 9% of the potential, indicating a significant untapped potential.

Further, there has been a substantial increase in the installed solar power capacity because of the government’s push in a bid to achieve COP26 targets¹. The pace of bidding has also remained strong. For instance, the Ministry of New & Renewable Energy (MNRE) has announced plans to invite bids for 50 GW of renewable energy capacity annually from FY24 to FY28 with an objective to achieve the targeted 500 GW installed capacity by 2030.

On the other hand, the domestic production of solar modules is expected to increase, driven by government initiatives such as the PLI scheme, which will further lower the dependence on imports for critical components, thereby addressing supply chain challenges and reducing the capital cost of solar power projects.

Moreover, as per the National Electricity Plan Vol-1 (March 2023), 186 GW of installed solar power capacity is expected to be achieved by FY27 and 365 GW by FY32. This represents an investment opportunity of Rs. 6.81 trillion FY23-27 and Rs. 7.97 trillion between FY28-32.

Chart 128: Solar Power – Trend in Future Installed Capacity Additions



Source: National Electricity Plan Vol-1 (March 2023), CAREEDGE Research

In line with the above-mentioned increase in capacity and investments, the demand for modules, which account for 55%-60% of the setting up costs of solar power plants, is also expected to increase considerably.

¹The COP 26 target by Government of India states that by 2030, the non-fossil fuel energy capacity would be 500 GW, and 50% of the energy requirement would be fulfilled by renewable sources. Also, the aim is to reduce the carbon intensity of the economy by 45% and reduce the total projected carbon emission by 1 billion tonnes.

Inorganic Chemicals

The Indian chemical industry witnessed stable growth in the past decade and the future growth potential is evaluated to be healthy. The upward momentum in demand for inorganic chemicals is estimated to remain healthy backed by low per capita consumption of chemicals (including agrochemicals), rising demand for specialty chemicals, and projected growth in downstream sectors like colours, paints, pigments, coatings, pharma, textiles, personal care, and growth in diversified manufacturing base. Further, the growing population, rising urbanization, and enhanced disposable incomes will aid the growth momentum.

In the coming years, India is expected to grow as both, a manufacturing capital for valued goods and a consumer-driven economy with a broader perspective. The industry is likely to benefit from improved investments, speedy approval of projects, and proposed reform measures that would translate into higher industrial activity, and in turn, higher demand for chemicals. Moreover, the growing research & development (R&D) investments are estimated to contribute to the inorganic chemicals market growth in the near-to-medium term.

Furthermore, the government has included this sector as a priority sector under the ambitious 'Make in India' initiative of the government. 'Make in India' has played a pivotal role in driving some of the key initiatives to stimulate growth in the chemicals industry (organic and inorganic). The government has already taken some crucial steps to create favourable conditions, in terms of policies and infrastructure, to attract global and domestic investments in the Indian chemicals industry. The results of such initiatives can be seen in the increasing interest displayed by major companies to expand their business in this sector.

Despite a reasonable export presence, the Indian chemical industry is significantly lagging compared to its Asian counterparts. The country's chemical industry represents only around 3% of the global chemicals industry despite its significant contribution to India's GDP.

However, there is rising adoption of the China-Plus-One strategy globally, where companies are minimizing their dependency on China and are diversifying their production and supply chains to other countries to minimize the risk of supply chain disruptions witnessed in China during the pandemic. Further, the changing regulatory and policy landscape in China has also prompted global companies to diversify supply risks.

Indian manufacturers are expected to be key beneficiaries of this as very few countries other than India have the requisite scale, skilled labour availability, government support, etc., to cater to the large-scale requirements. Further, as global companies look to enhance supply chain resilience by diversifying manufacturing into other countries, India is expected to be an attractive option owing to its strategic location, large domestic market and skilled manpower.

In order to be competitive at a global level, India will have to address the key issues of inadequate infrastructure and lack of availability of low-cost feedstock for production. Moreover, the industry can leverage new technologies and explore alternative feedstock options such as coal gasification, syngas, and pet coke to mitigate the issue of feedstock availability in the sector.

Agrochemicals

The Indian agrochemicals sector is expected to face near-term challenges including high channel inventory, declining input prices, increased supplies from China, and uncertain weather conditions due to El Nino. These factors are expected to contribute to a potential drop in revenue in FY24. Falling global prices, muted demand for exports, and lower reservoir levels impacting rabi sowing are key reasons for this decline. Additionally, volume growth within India is anticipated to be in the low single digits due to high inventories. The sector needs to closely monitor market dynamics, weather conditions, and global pricing trends to navigate these challenges effectively.

Despite these short-term challenges, the long-term outlook for India's agrochemicals sector remains positive. The sector is supported by strong domestic demand, improving export opportunities through the China + policy, potential for backward integration, competitive cost structures, and ongoing capital expenditures by Indian companies. As the challenges are addressed, the sector is poised to benefit from sustained growth driven by evolving market dynamics, innovation, and the essential role it plays in supporting agriculture and food security.

Biotechnology

India's biotech industry is experiencing robust growth, driven by its strategic focus on biopharmaceuticals and agricultural biotechnology. In the field of biopharmaceuticals, the country has made significant strides in research, development, and manufacturing, positioning itself as a key player on the global stage. The emphasis on agricultural biotechnology further amplifies India's role in addressing food security challenges and enhancing crop yields through innovative biotechnological solutions.

Additionally, India has emerged as a global hub for Contract Research and Manufacturing Services (CRAMS) in the biotech sector. This reflects the industry's capability to provide comprehensive services, from research collaboration to manufacturing, making it an attractive destination for international partnerships and investments. The flourishing biotech landscape underscores India's commitment to advancing scientific innovation and contributing to global healthcare and agriculture.

Personal Care

The Indian personal care market is experiencing significant growth driven by two key factors, rising disposable income and urbanization. As more consumers in urban areas experience an increase in income, there is a corresponding surge in their purchasing power and a growing inclination toward personal care products.

Furthermore, the trend toward natural and organic products is becoming increasingly prominent in the market. Consumers are showing a heightened awareness of the benefits associated with using natural ingredients in personal care items, contributing to the popularity of such products in the overall market landscape. This shift underscores a broader consumer preference for healthier and environmentally conscious choices in the personal care sector.

Animal Health

India's animal health market is witnessing robust growth, propelled by two primary factors, the steady rise in pet ownership and a dedicated emphasis on enhancing animal healthcare within both the pet care and livestock sectors. The increasing number of households adopting pets and the growing awareness of the importance of proper healthcare for animals have spurred a surge in demand for veterinary products and services.

Simultaneously, the livestock industry is experiencing a similar trend, with a heightened focus on improving the health and productivity of animals. This dual momentum reflects a broader societal recognition of the significance of animal health, driving the expansion of the animal health market in India.

Metallurgy

The metallurgy market in India is shaped by several key factors, including ongoing infrastructure development, robust growth in manufacturing activities, and strategic government initiatives such as "Make in India." The emphasis on building and upgrading infrastructure projects has led to an increased demand for metallurgical products, particularly steel and alloys.

Further, the growth in manufacturing, coupled with initiatives that promote domestic production and industrialization, propels the metallurgy market. "Make in India" specifically encourages indigenous manufacturing, attracting investments, and fostering the development of the metallurgical sector as a crucial component of the country's economic expansion and self-sufficiency goals.

Scientific and Laboratory Research

India's scientific and laboratory research market is undergoing substantial expansion, fueled by a surge in investments in Research and Development (R&D) activities. Academic institutions and pharmaceutical/biotech firms are playing pivotal roles in driving the heightened demand for cutting-edge laboratory equipment. With a growing focus on advancing scientific knowledge and innovation, these institutions and firms are investing in state-of-the-art technologies and tools for research purposes. This trend reflects a broader commitment to fostering a robust research ecosystem, positioning India as a key player in the global scientific community and contributing to advancements across various scientific disciplines.

Electronics

India's electronics market is experiencing notable growth, primarily driven by a surge in consumer electronics consumption and strategic government initiatives like "Digital India." The increasing adoption of digital technologies and the rising internet penetration have fueled the demand for electronic devices and components. "Digital India" aims to transform the nation into a digitally empowered society and knowledge economy, spurring advancements in electronic applications. This concerted effort aligns with the escalating consumer demand for smartphones, laptops, smart appliances, and other electronic gadgets. The trajectory of the electronics market in India is marked by a dynamic interplay between consumer preferences and government-led initiatives, contributing to a thriving and evolving industry landscape.

Precision Industrial Products

The precision industrial products market in India is propelled by the surging demand for high-precision components from the manufacturing sector. Key industries, including automotive, aerospace, and healthcare, significantly contribute to this demand.

In the automotive sector, precision components are crucial for manufacturing reliable and efficient vehicles. The aerospace industry relies on precision engineering for the production of intricate aircraft components. Whereas the healthcare sector requires high-precision products for medical devices and equipment. This convergence of demand from diverse sectors underscores the pivotal role of precision industrial products in fostering advancements across critical industries in India.

14. Key Challenges

Price Fluctuations

The global chemical manufacturing industry faces challenges related to fluctuating prices, availability of key raw materials, supply-chain disruptions, etc. The price of end-products also fluctuates due to global demand-supply dynamics. For example, citrate prices increased significantly in CY2022. However, they are expected to moderate in the current year. At the same time, price fluctuations of both raw materials and end products pose a challenge for the manufacturers since the changes in working capital requirements also impact their profitability.

Stringent Quality Norms

There are stringent quality norms required to be followed for chemical production, especially if they are used in pharmaceuticals, nutraceuticals, laboratory reagents, etc. These guidelines are applicable to the production, storage, handling, transport, and disposal of hazardous materials. Developed regions like the US and Europe particularly have strict guidelines for such imported products. Therefore, such suppliers need to ensure that their facilities and products are compliant with the prescribed quality guidelines, as the failure to comply has a significant adverse impact on the company's business.

Global Inflationary Pressures and Geo-Political Tensions

Currently, inflation is significantly high in most countries globally, which has led to the central banks raising interest rates. Also, the high inflation and interest rates have impacted the savings and discretionary spending globally, which is likely to have a near-term impact on demand for food & beverage and nutraceuticals, among others.

Furthermore, the ongoing geopolitical tensions may lead to raw material supply issues, transportation disruptions, and impact demand from key consuming markets.

Environmental Concerns

The chemical industry has been facing challenges due to effluent discharge and soil contamination. As the global focus increases on climate change and sustainability, the chemical industry players will need to invest in R&D and better technology to minimize the environmental impact of the production process.

15. Peer Comparison

15.1 Indian Companies

a. Kronox Lab Sciences Ltd.

Kronox Lab Sciences Ltd. is a manufacturer of high-purity speciality fine chemicals. It manufactures products compliant with reagents, pharmacopeia, and various food grade standards used in the pharmaceutical, nutraceutical, veterinary, food, biotech, chemical analysis and research, metallurgy, personal care and other specialty markets. The company is headquartered in Padra, Vadodara, Gujarat. The company's product groups include acetates, carbonates, chlorides, citrates, hypophosphates, nitrates, nitrites, phosphates, sulphates, and other ultra-pure fine chemicals.

Table 49: Key Financials of Kronox Lab Science (in Rs. Million)

| Particulars | FY2019 | FY2020 | FY2021 | FY2022 | FY2023 | 9MFY2023 | 9MFY2024 |
|-------------------------|--------|--------|--------|--------|--------|----------|----------|
| Revenue | 466.5 | 505.0 | 632.5 | 833.4 | 975.0 | 758.9 | 684.4 |
| EBITDA | 110.9 | 127.8 | 156.5 | 207.2 | 236.3 | 196.6 | 212.1 |
| EBITDA Margin | 23.8% | 25.3% | 24.8% | 24.9% | 24.2% | 25.9% | 31.0% |
| Profit After Tax | 71.0 | 85.9 | 97.3 | 136.1 | 164.0 | 140.9 | 154.7 |
| Profit After Tax Margin | 15.2% | 17.0% | 15.4% | 16.3% | 16.8% | 18.6 | 22.6% |

Source: Audited Financial Statements, CAREEDGE Research

b. Sudeep Pharma Pvt. Ltd.

Sudeep Pharma, established in 1989, is a manufacturer and exporter of calcium phosphates and calcium carbonate. The company's facilities are located in Vadodara, Gujarat. It has a production capacity of 50,000 MT per annum. The company caters to the pharma, food, and feed segments, with 1,000+ customers across 80+ countries.

Table 50: Key Financials of Sudeep Pharma Pvt. Ltd. (in Rs. Million)

| Particulars | FY2019 | FY2020 | FY2021 | FY2022 | FY2023 |
|-------------------------|--------|---------|---------|---------|--------|
| Revenue | 890.8 | 1,230.1 | 2,151.1 | 3,430.1 | 4382.3 |
| EBITDA | 204.3 | 286.1 | 475.2 | 748.5 | 980.4 |
| EBITDA Margin | 22.9% | 23.3% | 22.1% | 21.8% | 22.4% |
| Profit After Tax | 117.5 | 180.4 | 333.4 | 501.7 | 617.5 |
| Profit After Tax Margin | 13.2% | 14.7% | 15.5% | 14.6% | 14.1% |

Source: Annual Report, CAREEDGE Research

c. Canton Laboratories Pvt. Ltd.

Canton Laboratories Pvt. Ltd. is a manufacturer of specialty chemicals, pharma, and food chemicals. The company's facilities are located in Vadodara, Gujarat. It caters to the domestic market and exports its products to Bangladesh, Egypt, Saudi Arabia, the United Kingdom, and South Africa. The company's major products are dried ferrous sulfate, aluminium chloride hexahydrate, sodium metabisulfite, sodium tripolyphosphate, etc.

Table 51: Key Financials for Canton Laboratories Pvt. Ltd. (in Rs. Million)

| Particulars | FY2019 | FY2020 | FY2021 | FY2022 | FY2023 |
|-------------------------|--------|--------|--------|---------|---------|
| Revenue | 726.2 | 784.9 | 907.0 | 1,024.3 | 1,202.2 |
| EBITDA | 238.8 | 279.0 | 329.1 | 342.2 | 425.2 |
| EBITDA Margin | 32.9% | 35.5% | 36.3% | 33.4% | 35.4% |
| Profit After Tax | 230.4 | 187.0 | 235.3 | 236.1 | 327.9 |
| Profit After Tax Margin | 31.7% | 23.8% | 25.9% | 23.0% | 27.3% |

Source: Annual Report, CAREEDGE Research

d. Tatva Chintan Pharma Chem Limited

Tatva Chintan Pharma Chem Limited is a leading specialty chemical manufacturer based in Vadodara, Gujarat, India. Established in 1996, the company specializes in producing innovative specialty chemicals, phase transfer catalysts, pharmaceutical intermediates, and electrolyte salts for diverse industries worldwide. With state-of-the-art manufacturing facilities and a strong focus on research and development, Tatva Chintan is recognized for its quality products and commitment to sustainability. The company exports to over 25 countries and is known for its customer-centric approach, global presence, and emphasis on corporate responsibility.

Table 52: Key Financials for Tatva Chintan Pharma Chem Limited (in Rs. Million)

| Particulars | FY2021 | FY2022 | FY2023 |
|-------------------------|----------|----------|----------|
| Revenue | 3,003.59 | 4,336.47 | 4,236.12 |
| EBITDA | 657.02 | 1,082.35 | 569.94 |
| EBITDA Margin | 21.87% | 24.96% | 13.45% |
| Profit After Tax | 522.62 | 958.74 | 454.87 |
| Profit After Tax Margin | 17.10% | 21.66% | 10.59% |

Source: CAREEDGE Research

e. TANFAC Industries Limited

TANFAC Industries Limited is a prominent chemical manufacturing company headquartered in Chennai, Tamil Nadu, India. Established in 1972, TANFAC specializes in producing a diverse range of industrial chemicals, including hydrogen fluoride, refrigerants, and fluorine-based specialty chemicals for various applications. With state-of-the-art manufacturing facilities and a strong focus on research and development, the company is known for its high-quality products and innovative solutions. TANFAC's commitment to sustainability, safety, and customer satisfaction has earned it recognition as a trusted partner in the chemical industry both domestically and internationally.

Table 53: Key Financials for TANFAC Industries Limited (in Rs. Million)

| Particulars | FY2021 | FY2022 | FY2023 |
|-------------------------|----------|----------|----------|
| Revenue | 1,478.96 | 3,201.72 | 3,749.48 |
| EBITDA | 326.86 | 751.62 | 747.58 |
| EBITDA Margin | 22.10% | 23.48% | 19.94% |
| Profit After Tax | 174.74 | 532.84 | 561.30 |
| Profit After Tax Margin | 11.71% | 16.47% | 14.66% |

Source: CAREEDGE Research

f. NEOGEN Chemicals Limited

NEOGEN Chemicals Limited is a prominent specialty chemicals manufacturer headquartered in Navi Mumbai, Maharashtra, India. Established in 1989, the company specializes in the production of specialty chemicals, particularly bromine-based and lithium-based compounds, for various industries including pharmaceuticals, agrochemicals, and electronics. NEOGEN Chemicals is renowned for its cutting-edge research and development capabilities, state-of-the-art manufacturing facilities, and stringent quality control standards. With a commitment to innovation, sustainability, and customer satisfaction, the company has established a strong presence in domestic and international markets, serving a diverse clientele across the globe.

Table 54: Key Financials for NEOGEN Chemicals Limited (in Rs. Million)

| Particulars | FY2021 | FY2022 | FY2023 |
|-------------------------|----------|----------|----------|
| Revenue | 3,364.10 | 4,872.50 | 6,861.80 |
| EBITDA | 647.40 | 867.70 | 1,117.20 |
| EBITDA Margin | 19.24% | 17.81% | 16.28% |
| Profit After Tax | 313.30 | 446.30 | 499.70 |
| Profit After Tax Margin | 9.31% | 9.14% | 7.24% |

Source: CAREEDGE Research

g. Sigachi Industries Limited

Sigachi Industries Limited is a prominent pharmaceutical excipients and food ingredients manufacturing company headquartered in Mumbai, India. The company has grown to become a trusted provider of high-quality ingredients for the pharmaceutical, nutraceutical, food, and beverage industries. With a focus on innovation, quality, and customer satisfaction, Sigachi Industries offers a diverse range of products including binders, disintegrants, lubricants, and sweeteners, catering to the specific needs of its clients. The company's commitment to excellence, state-of-the-art manufacturing facilities, and adherence to stringent quality standards have earned it a strong reputation in the industry.

Table 55: Key Financials for Sigachi Industries Limited (in Rs. Million)

| Particulars | FY2021 | FY2022 | FY2023 |
|-------------------------|----------|----------|----------|
| Revenue | 1,927.56 | 2,502.90 | 3,020.45 |
| EBITDA | 387.90 | 530.44 | 587.25 |
| EBITDA Margin | 20.12% | 21.19% | 19.44% |
| Profit After Tax | 302.60 | 400.37 | 435.36 |
| Profit After Tax Margin | 15.44% | 15.83% | 14.10% |

Source: CAREEDGE Research

h. DMCC Speciality Chemical Limited

With a foundation rooted in innovation and excellence, the company is dedicated to the development, manufacturing, and distribution of high-quality specialty chemicals catering to diverse industries globally. Leveraging advanced technology and a robust research and development infrastructure, DMCC Speciality Chemical is known for its cutting-edge products and solutions tailored to meet the evolving needs of its clients. Committed to sustainability and customer satisfaction, the company has established itself as a trusted partner, driving growth and value creation in the specialty chemicals market.

Table 56: Key Financials for DMCC Speciality Chemical Limited (in Rs. Million)

| Particulars | FY2021 | FY2022 | FY2023 |
|-------------------------|----------|----------|----------|
| Revenue | 2,001.48 | 3,263.00 | 3,847.36 |
| EBITDA | 354.93 | 406.57 | 339.30 |
| EBITDA Margin | 17.73% | 12.46% | 8.82% |
| Profit After Tax | 325.79 | 213.40 | 69.31 |
| Profit After Tax Margin | 15.67% | 6.42% | 1.78% |

Source: CAREEDGE Research

15.2 Global Companies

a. Jost Chemicals, USA

Jost Chemicals is a USA-based, privately owned and operated company with 35 years of existence. The company manufactures a broad range of high-purity specialty chemicals for the pharmaceutical, nutritional, food, reagents, and other specialty markets. The company's products include powders less than 6 microns to granular versions that are free-flowing and directly compressible.

Jost Chemicals manufactures 250+ chemicals and exports to over 60 countries. It offers a variety of salts like Acetates, Ascorbates, Aspartates, Caprates, Caprylates, Carbonates, Citrates, Formates, Fumarates, Gluconates, Glycinates, Hydroxides, Lactates, Malates, Nitrates, Oxides, Phosphates, Succinates, and Sulfates.

Table 57: Key Financials for Jost Chemicals (in Rs. Million)

| Particulars | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 |
|-------------------------|---------|---------|---------|----------|----------|
| Revenue | 6,572.3 | 7,361.0 | 7,967.9 | 10,043.5 | 11,760.1 |
| EBITDA | 1,687.5 | 1,809.8 | 1,883.6 | 2,432.0 | 2,898.0 |
| EBITDA Margin | 25.7% | 24.6% | 23.6% | 24.2% | 24.6% |
| Profit After Tax | 983.4 | 1,121.1 | 1,238.2 | 1,493.9 | 1,836.9 |
| Profit After Tax Margin | 15.0% | 15.2% | 15.5% | 14.9% | 15.6% |

Source: Maia Research, CAREEDGE Research.

Note: Figures are on a consolidated basis. 1 USD= 68.82, 70.42, 74.10, 73.92, 78.60 for CY2018, CY2019, CY2020, CY2021 and CY2022 respectively.

b. Macco Organiques

Macco Organiques, a Czech Republic-based company, was established in 1976 and is a producer and supplier of inorganic salts for Intravenous fluid and dialysis solutions, pharmaceuticals, biotechnology, infant formulas, nutritional supplements, veterinarian preparations, mineralized and bottled water, and personal care. The company's key products include calcium chloride 2hy, magnesium chloride 6hy, magnesium sulphate dried, magnesium sulphate heptahydrate, zinc sulphate x-hydrate, ammonium sulphate, sodium sulphate anhydrous, and potassium chloride and potassium nitrate.

Table 58: Key Financials for Macco Organiques (in Rs. Million)

| Particulars | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 |
|-------------------------|---------|---------|---------|---------|---------|
| Revenue | 3,520.1 | 3,906.2 | 4,012.5 | 4,688.7 | 5,660.0 |
| EBITDA | 836.2 | 950.0 | 896.6 | 1,119.9 | 1,279.6 |
| EBITDA Margin | 23.8% | 24.3% | 22.3% | 23.9% | 22.6% |
| Profit After Tax | 500.3 | 586.6 | 549.1 | 670.5 | 755.3 |
| Profit After Tax Margin | 14.2% | 15.0% | 13.7% | 14.3% | 13.3% |

Source: Maia Research, CAREEDGE Research.

Note: Figures are on a consolidated basis. 1 USD= 68.82, 70.42, 74.10, 73.92, 78.60 for CY2018, CY2019, CY2020, CY2021 and CY2022 respectively.

c. Budenheim

Budenheim is a Germany-headquartered specialty chemical company with a presence in the fields of nutrition, health, safety, and preservation of resources. It was founded in 1908 and has facilities in Germany, China, Mexico, USA, Spain, and the Netherlands. The company has sales in 100+ countries and has around 2,000+ customers.

Table 59: Key Financials for Budenheim (in Rs. Million)

| Particulars | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 |
|-------------|----------|----------|----------|----------|----------|
| Revenue | 21,376.2 | 22,818.2 | 24,257.8 | 31,026.4 | 45,046.4 |

| | | | | | |
|-------------------------|---------|---------|---------|---------|----------|
| EBITDA | 5,127.1 | 5,599.8 | 5,742.7 | 7,332.1 | 11,253.9 |
| EBITDA Margin | 24.0% | 24.5% | 23.7% | 23.6% | 25.0% |
| Profit After Tax | 3,065.2 | 3,338.6 | 3,426.3 | 4,338.4 | 6,812.3 |
| Profit After Tax Margin | 14.3% | 14.6% | 14.1% | 14.0% | 15.1% |

Source: Maia Research, CAREEDGE Research.

Note: Figures are on a consolidated basis. 1 USD= 68.82, 70.42, 74.10, 73.92, 78.60 for CY2018, CY2019, CY2020, CY2021 and CY2022 respectively.

d. Jiangsu Kolod Food Ingredients Co Ltd.

Jiangsu Kolod Food Ingredients Co. Ltd. is a China-based manufacturer of fine chemicals. Its products include phosphates, sulfates, chlorides, citrates, formats, acetates, etc. These chemicals are widely used in the food, pharmaceutical, electronic, and reagent industries. Its products are exported to 90+ countries.

Table 60: Key Financials for Jiangsu Kolod Food Ingredients Co Ltd. (in Rs. Million)

| Particulars | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 |
|-------------------------|---------|---------|---------|----------|----------|
| Revenue | 4,983.3 | 6,244.8 | 7,652.2 | 13,449.0 | 20,689.1 |
| EBITDA | 947.7 | 1,238.0 | 1,478.3 | 2,551.7 | 3,944.1 |
| EBITDA Margin | 19.0% | 19.8% | 19.3% | 19.0% | 19.1% |
| Profit After Tax | 547.1 | 694.3 | 829.9 | 1,340.2 | 2,301.4 |
| Profit After Tax Margin | 11.0% | 11.1% | 10.8% | 10.0% | 11.1% |

Source: Maia Research, CAREEDGE Research.

Note: Figures are on a consolidated basis. 1 USD= 68.82, 70.42, 74.10, 73.92, 78.60 for CY2018, CY2019, CY2020, CY2021 and CY2022 respectively.

e. CFL Chemische Fabrik Lehrte GmbH & Co. KG

CFL, established in 1888, has more than 130 years of manufacturing presence in the production of salts. The company is a Germany-based manufacturer of calcium chloride, magnesium chloride, magnesium sulfate, potassium polysulfide, sodium sulfate, sodium chloride, and potassium chloride. CFL manufactures products for pharmaceuticals, nutrition & diet supplements, dialysis & infusion, and other specialty applications.

Table 61: Key Financials for CFL Chemische Fabrik Lehrte GmbH & Co. KG (in Rs. Million)

| Particulars | CY2018 | CY2019 | CY2020 | CY2021 | CY2022 |
|-------------------------|---------|---------|---------|---------|---------|
| Revenue | 1,035.1 | 1,183.8 | 1,288.6 | 1,556.8 | 1,907.6 |
| EBITDA | 209.9 | 244.4 | 252.7 | 312.7 | 379.6 |
| EBITDA Margin | 20.3% | 20.6% | 19.6% | 20.1% | 19.9% |
| Profit After Tax | 97.0 | 109.2 | 113.4 | 140.4 | 169.0 |
| Profit After Tax Margin | 9.4% | 9.2% | 8.8% | 9.0% | 8.9% |

Source: Maia Research, CAREEDGE Research.

Note: Figures are on a consolidated basis. 1 USD= 68.82, 70.42, 74.10, 73.92, 78.60 for CY2018, CY2019, CY2020, CY2021 and CY2022 respectively.

f. Ichimaru Co Ltd.

Japan-based Ichimaru is engaged in chemical trading, specializing in the import & export of cosmetics, health foods, and pharmaceutical quasi-drug raw materials. It was established in 1959. The company is primarily engaged in the sodium acetate anhydrous business. It is a food-grade additive used to improve the shelf-life of the products. The company has 1,000+ natural raw ingredients originating from plants, animals, and microorganisms. Moreover, it has sales in 50+ countries with 700+ patent applications in Japan and internationally.

Table 62: Key Financials for Ichimaru Co Ltd. (in Rs. Million)

| Particulars | 2018 | 2019 | 2020 | 2021 | 2022 |
|-------------------------|---------|---------|---------|---------|---------|
| Revenue | 3,048.0 | 3,597.1 | 3,676.1 | 4,518.7 | 5,757.5 |
| EBITDA | 944.2 | 1,126.7 | 1,133.0 | 1,403.0 | 1,748.9 |
| EBITDA Margin | 31.0% | 31.3% | 30.8% | 31.0% | 30.4% |
| Profit After Tax | 668.9 | 804.2 | 784.0 | 999.4 | 1,260.0 |
| Profit After Tax Margin | 21.9% | 22.4% | 21.3% | 22.1% | 21.9% |

Source: Maia Research, CAREEDGE Research.

Note: Figures are on a Consolidated basis. 1 USD= 68.82, 70.42, 74.10, 73.92, 78.60 for CY2018, CY2019, CY2020, CY2021 and CY2022 respectively.

15.3 Comparison of Financial Parameters

15.3.1 Profitability Ratios

EBITDA Margin

During 2022, the EBITDA margin of chemical companies was in the range of 8.8%-24.2%, with an average EBITDA margin of 19.6%. The EBITDA margin of companies declined marginally in 2021 compared to 2020. Kronox Lab Sciences reported an EBITDA margin of 24.9% in FY22. However, it declined marginally in FY23 to 24.2%. The company has consistently maintained its margin above 24.0% in the past 3 years.

Table 63: EBITDA Margin (%)

| Peer Group | FY2021 | FY2022 | FY2023 |
|-----------------------------------|--------|--------|--------|
| Kronox Lab Sciences Limited | 24.8% | 24.9% | 24.2% |
| Sudeep Pharma | 22.1% | 21.8% | NA |
| Canton Laboratories | 36.3% | 33.4% | 35.4% |
| *Jost Chemicals | 24.2% | 24.6% | NA |
| *Macco Organiques | 23.9% | 22.6% | NA |
| *Budenheim | 23.6% | 25.0% | NA |
| *Jiangsu Kolod Food | 19.0% | 19.1% | NA |
| *CFL Chemische Fabrik Lehrte | 20.1% | 19.9% | NA |
| *Ichimaru Co Ltd | 31.0% | 30.4% | NA |
| Tatva Chintan Pharma Chem Limited | 21.9% | 25.0% | 13.5% |
| TANFAC Industries Limited | 22.1% | 23.5% | 19.9% |
| NEOGEN Chemicals Limited | 19.2% | 17.8% | 16.3% |
| Sigachi Industries Limited | 20.1% | 21.2% | 19.4% |
| DMCC Speciality Chemical Limited | 17.7% | 12.5% | 8.8% |

Note:

1. For Indian companies data is as per fiscal year.
2. *Global Companies' figures are on CY basis

Net Profit Margin

The net profit margin of chemical companies was slightly impacted in terms of 2021 vs 2020. However, it has recovered with businesses recovering from the impact of the pandemic in 2020 and 2021. The average net profit margin of all companies crossed the pre-pandemic levels in 2022 at 16.3% from 15.4% in 2021.

Kronox Lab Science reported a net profit margin of 16.3% in FY2022 and 16.8% in FY2023.

Table 64: Net Profit Margin (%)

| Peer Group | FY2021 | FY2022 | FY2023 |
|-----------------------------------|--------|--------|--------|
| Kronox Lab Sciences Limited | 15.4% | 16.3% | 16.8% |
| Sudeep Pharma | 15.5% | 14.6% | NA |
| Canton Laboratories | 25.9% | 23.0% | 27.3% |
| *Jost Chemicals | 14.9% | 15.6% | NA |
| *Macco Organiques | 14.3% | 13.3% | NA |
| *Budenheim | 14.0% | 15.1% | NA |
| *Jiangsu Kolod Food | 10.0% | 11.1% | NA |
| *CFL Chemische Fabrik Lehrte | 9.0% | 8.9% | NA |
| *Ichimaru Co Ltd | 22.1% | 21.9% | NA |
| Tatva Chintan Pharma Chem Limited | 17.1% | 21.7% | 10.6% |
| TANFAC Industries Limited | 11.7% | 16.5% | 14.7% |
| NEOGEN Chemicals Limited | 9.3% | 9.1% | 7.2% |
| Sigachi Industries Limited | 15.4% | 15.8% | 14.1% |
| DMCC Speciality Chemical Limited | 15.7% | 6.4% | 1.8% |

Note:

- For Indian companies data is as per fiscal year.
- *Global Companies' figures are on CY basis

15.3.2 Return and Liquidity Ratios

ROCE (%)

The average ROCE of Indian companies stood at 20.7% in FY23 compared to 24.8% and 25.1% in FY22 and FY21, respectively. Kronox reported a ROCE of 48.3% in FY23.

Table 65: ROCE (%)

| Peer Group | FY2021 | FY2022 | FY2023 |
|-----------------------------------|--------|--------|--------|
| Kronox Lab Sciences Limited | 43.9% | 42.8% | 48.3% |
| Sudeep Pharma | 26.1% | 27.7% | NA |
| Canton Laboratories | 17.7% | 16.5% | 18.2% |
| Tatva Chintan Pharma Chem Limited | 23.0% | 16.9% | 6.9% |
| TANFAC Industries Limited | 29.1% | 52.0% | 37.1% |
| NEOGEN Chemicals Limited | 15.0% | 11.3% | 11.3% |
| Sigachi Industries Limited | 31.9% | 19.1% | 16.9% |
| DMCC Speciality Chemical Limited | 14.3% | 12.0% | 5.8% |

Note:

- Global Peers data is not available

Debt to Equity Ratio

The average DE ratio of Indian companies in FY23 was 0.2 times compared to 0.3 times and 0.3 times in FY22 and FY21, respectively. Kronox reported a current ratio of 0.0 times in FY23.

Table 66: DE Ratio (In Times)

| Peer Group | FY2021 | FY2022 | FY2023 |
|-----------------------------------|--------|--------|--------|
| Kronox Lab Sciences Limited | 0.1 | 0.1 | 0.0 |
| Sudeep Pharma | 0.5 | 0.6 | 0.0 |
| Canton Laboratories | 0.0 | 0.0 | 0.0 |
| Tatva Chintan Pharma Chem Limited | 0.5 | 0.3 | 0.3 |
| TANFAC Industries Limited | 0.0 | 0.0 | 0.0 |
| NEOGEN Chemicals Limited | 1.1 | 0.5 | 0.8 |
| Sigachi Industries Limited | 0.2 | 0.2 | 0.2 |
| DMCC Speciality Chemical Limited | 0.2 | 0.4 | 0.4 |

Note:

1. Global Peers data is not available

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