

‘Dynamic Trends in India's Chemical Industry: A Comprehensive Analysis of Export Performance’

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Abstract

The Indian chemical industry has witnessed significant growth in recent years, emerging as a formidable player in the global market. This study provides a comprehensive analysis of India's chemical export performance, aiming to uncover the underlying drivers and challenges shaping its trajectory. Leveraging a combination of trade data analysis, industry reports, and economic indicators, the research offers insights into the dynamics fuelling India's chemical exports. Key findings indicate that India's chemical exports have experienced steady growth, driven by factors such as technological advancements, policy reforms, and evolving consumer demands. The country's robust manufacturing capabilities, coupled with a skilled workforce and competitive pricing, have positioned it favorably in the global market landscape. Furthermore, strategic initiatives such as the "Make in India" campaign and various trade agreements have facilitated market access and bolstered export competitiveness. However, the study also highlights several challenges confronting India's chemical exporters. Regulatory complexities, compliance issues, and environmental concerns pose significant hurdles to sustainable growth. Additionally, fluctuations in global demand and market volatility present uncertainties for exporters, necessitating proactive risk management strategies.

Overall, this research contributes to the broader discourse on the evolving landscape of India's chemical exports, offering valuable insights for industry stakeholders, policymakers, and researchers alike.

(Keywords: Chemical exports, Growth trends, dye, cosmetics)

1. Introduction

India's chemical industry stands as a formidable player in the global market, holding the sixth position worldwide and ranking third in Asia for production. With a valuation of US\$ 178 billion, this sector is poised for significant expansion, projected to reach a staggering US\$ 300 billion by the year 2025. Within this expansive landscape, India's chemical exports play a pivotal role, contributing to the country's economic growth and global trade relations.

India's Chemical Industry Landscape: The chemical industry in India is a multifaceted domain encompassing various segments, including basic chemicals, specialty chemicals, agrochemicals, petrochemicals, pharmaceuticals, and more. Boasting a diverse portfolio of products and applications, the sector caters to both domestic demand and international markets. The industry's growth is fueled by factors such as robust manufacturing capabilities, technological advancements, a skilled workforce, and favorable government policies aimed at promoting industrial growth and exports.

Export Performance and Contribution: India's chemical exports have witnessed steady growth over the years, buoyed by increasing demand from key markets across the globe. Major categories of chemical exports include dyes and pigments, organic chemicals, inorganic chemicals, agrochemicals, and polymers, among others. These products find applications in various sectors such as textiles, pharmaceuticals, agriculture, automotive, construction, and consumer goods, underscoring their significance in driving industrial activity and economic development.

Challenges and Opportunities: Despite its promising growth trajectory, India's chemical export sector faces several challenges, including regulatory compliance, infrastructure constraints, logistics bottlenecks, and global trade dynamics. Additionally, the industry must contend with evolving environmental regulations, sustainability concerns, and competition from other manufacturing hubs. However, amidst these challenges lie numerous opportunities for expansion, innovation, and market diversification. Leveraging India's strengths in research and development, technological innovation, and cost-effective manufacturing can unlock new avenues for growth and global market penetration.

In "Building a Robust Case for Sustainability in the Chemical Industry" (Schindel, 2003), the focus is on the necessity for individualized approaches to sustainability rather than a universal measure. Karthikeyan (2004) stresses the importance of Process Safety Management Systems in India's chemical industry, advocating for specialized training in disaster management. Prahalathan (2007) highlights the Indian chemical industry's strength in research and technology, proposing reduced dependence on imports. Lastly, Ikechukwu and Nwakaego (2015) discuss the vital role of accounts receivable management in Nigerian building materials and paint manufacturing firms' profitability. "The chemical sector plays a vital role in stimulating economic growth, enhancing quality of life, and bolstering diverse industries within the nation" Rama Rao (2015).

The chemical industry's role as a key enabler of economic growth is universally acknowledged. Its products are indispensable in modern society, facilitating advancements in technology, energy, and everyday essentials. From the components of smartphones to renewable energy sources like solar panels and energy-efficient LED lights, the chemical industry underpins numerous innovations that enhance our lives. In India, this sector occupies a pivotal position in fulfilling basic needs and elevating the quality of life for millions.

Despite India's significant shortfall in conventional hydrocarbons, the country boasts a well-established refining industry that serves as a crucial source of basic chemical industry feedstocks. The chemical sector, characterized by its reliance on knowledge and capital, serves as a cornerstone for industrial and agricultural development. It provides essential building blocks for downstream industries such as textiles, paper, paints, soaps, detergents, and pharmaceuticals, among others.

The fertilizer and agrochemical industries play a vital role in ensuring food security and are integral to India's developing agrarian economy. Similarly, the synthetic fiber industry plays a pivotal role in providing affordable clothing, while the pharmaceutical sector extends access to low-cost drugs to the country's vast population. These industries not only meet domestic demands but also contribute significantly to India's export revenue, bolstering its position in the global market.

In essence, the chemical industry in India catalyzes socio-economic development, driving innovation, and industrial growth, and enhancing the overall standard of living. Its multifaceted contributions underscore its importance as a strategic sector, essential for the nation's progress and prosperity.

2. Research design.

Research gap:

Previous research conducted by various researchers has highlighted a significant research gap in studies related to the export performance of the petrochemical industry. While existing studies have primarily focused on petrochemicals, there is a notable lack of research in other areas within the chemical sector. Specifically, research has been scarce such as Dyes and Dye Intermediates, Basic Inorganic & Organic Chemicals, including Agrochemicals Cosmetics, Soaps, Toiletries & Essential Oils. Specialty Chemicals, Lubricants, and Castor Oil these diverse segments of the chemical industry, each with its unique characteristics, challenges, and contributions to the economy. Despite their significance, they have received limited attention in academic research compared to the dominant focus on petrochemicals.

Addressing this research gap is crucial for gaining a comprehensive understanding of the chemical industry's export performance and identifying opportunities for growth and improvement across various sectors. By exploring these underrepresented areas, researchers can provide valuable insights that contribute to a more holistic understanding of the chemical industry's role in the global market and inform policy decisions and industry strategies accordingly.

3. OBJECTIVES

1. To analyse the Dynamic Trends in India's Chemical Industry
2. To analyse the export performance of Dyes and Dye Intermediates, Basic Inorganic & Organic Chemicals, including Agrochemicals Cosmetics, Soaps, Toiletries & Essential Oils. Specialty Chemicals, Lubricants, and Castor Oil industries.

4. Methodology

The study will adopt a descriptive research design to analyse the dynamic trends and export performance of different segments within India's chemical industry. Descriptive research enables a systematic investigation of phenomena to describe and understand their characteristics and behaviors.

5. Sources of data collection

Data will be from secondary sources such as industry reports, government publications, trade statistics, and academic articles. These sources will provide comprehensive data on the production, export trends, market dynamics, and regulatory frameworks relevant to the chemical industry in India.

6. Data Analysis:

Simple statistical techniques such as trend analysis and descriptive statistical tools are applied to draw statistical inferences.

7. Limitation

1. This study is confined to chemical industries other than petrochemicals.
2. More data might have yielded better results for generalization.

8. Data analysis

India's chemical industry is a significant player in global markets, ranking sixth worldwide and third in Asia for production. Valued at US\$ 178 billion, it is expected to reach US\$ 300 billion by 2025. With two million employees, India is the 14th largest chemical exporter globally, contributing 2.5% to global sales. Including agrochemicals, petrochemicals, and specialty chemicals. India ranks fourth in agrochemical production, making over 50% of technical-grade pesticides. Government initiatives aim to boost growth and competitiveness through infrastructure development.

SL no	Year	Value exports in US \$ Millions	Volume in million metric tones
1	2017-18	24.9	47.88
2	2018-19	28.7	49.1
3	2019-20	37.2	55.46

4	2020-21	36.1	53.4
5	2021-22	24.3	57.33

Source: ibef

The table presents the annual exports of major chemicals and petrochemicals from India over five fiscal years, from 2017-2018 to 2021-2022. In the initial year of 2017-2018, exports amounted to \$24.9 million, accompanied by a volume of 47.88 million metric tons. The subsequent fiscal year, 2018-2019, witnessed a moderate increase in both export value and volume, reaching \$28.7 million and 49.1 million metric tons, respectively. However, a notable surge occurred in 2019-2020, with exports soaring to \$37.2 million, coupled with a substantial volume of 55.46 million metric tons. Despite this peak, exports experienced a slight downturn in 2020-2021, declining to \$36.1 million, while the volume decreased to 53.4 million metric tons. The latest available data for 2021-2022 reveals a significant drop in exports to \$24.3 million, despite a marginal uptick in volume to 57.33 million metric tons. Due to cutthroat competition and the global post-pandemic stagnation. These figures underscore the dynamic nature of India's chemical and petrochemical export market over the specified period.

Products	2020-21		2021-22		% Growth	
	Volume	Value	Volume	Value	Volume	Value
Dyes	4,73,041.74	2,345.86	544599.1	3078.62	15.13	31.24
Dye Intermediates	54,679.68	145.58	57561.34	165.15	5.27	13.44
Inorganic Chemicals	1827386.87	1055	2600487	1766.59	42.31	67.45
Organic Chemicals	7073660.23	7636.74	6878306	10946.37	-2.76	43.34
Agro Chemicals	533487.04	3579.69	648628.2	4896.64	21.58	36.79
Cosmetics & Toiletries	0	1,618.88	746170.3	1973.96	0	21.93
Essential Oils	11,459.57	234.04	15497.86	310.64	35.24	32.73
Speciality Chemicals and Castor Oil	734336.46	917.24	715209.6	1175.5	-2.6	28.16
Total	10708051.59	17533	12206459	24313.47	13.99	38.67

Source: DGCI&S

The export performance of various chemical categories witnessed mixed trends during the fiscal years 2020-21 and 2021-22. Notably, significant growth was observed in inorganic chemicals, with a remarkable 42.31% increase in volume and a staggering 67.45% rise in value. Argo chemicals also saw substantial growth, with a volume increase of 21.58% and a value increase of 36.79%. Essential oils exhibited a notable 35.24% increase in volume and a 32.73% increase in value. Conversely, organic chemicals experienced a slight decline in volume by 2.76% but marked growth in value by 43.34%. Specialty chemicals and castor oil saw a decrease of 2.6% in volume but a notable increase of 28.16% in value. Overall, the total export volume increased by 13.99%, while the total export value surged by 38.67% during the period analysed.

Table: 03 TOP EXPORTS OF DYES		Value in USD Million		
SL No	Products	2020-21	2021-22	% Growth
1	PIGMENT BLUE	236.45	306.71	29.71
2	REACTIVE BLACKS	214.9	307.6	43.14
3	PIGMENT GREEN	151.49	223.1	47.27
4	REACTIVE BLUES	130.58	190.63	45.99
5	ACID BLACKS	85.21	118.04	38.53
6	REACTIVE REDS	91.94	120.07	30.6
7	OTHER PIGMENT BLUE	113.88	136.53	19.89
8	OTHER PIGMENT RED	80.67	92.83	15.07
9	OTHER PIGMENTS YELLOW	70.2	89.75	27.85
10	PIGMENT VIOLET	74.85	89.39	19.43
11	REACTIVE YELLOWS	71.28	92.75	30.12
12	OPTICAL WHITENING AGENTS	59.8	84.99	42.12
13	OTHER FOOD COLOURING MATTERS	41.93	49.69	18.51
14	FOOD YELLOW 4 (TARTRAZINE)	34.48	44.32	28.54
15	ACID BROWNS	30.12	43.87	45.65
16	OTHER DISPERSE BLUE	45.17	50.9	12.69
17	OTHER DIRECT YELLOW (AZO)	31.09	34.09	9.65
18	OTHER REACTIVE DYES	26.69	34.67	29.9
19	SOLVENT-BASED COLOURING MATTERS: YELLOWS	26.72	38.34	43.49
20	REACTIVE ORANGES	35.69	41.31	15.75

Source: DGCI&S

The provided table outlines the top exports of dyes from India, comparing their values in USD million for the fiscal years 2020-2021 and 2021-2022, along with the percentage

growth. A comprehensive analysis reveals a generally positive trend in the export market for dyes, with most products experiencing growth in export values over the specified period. Pigment Blue, Reactive Blacks, and Pigment Green emerge as the leading products in terms of export value, with significant growth rates observed across the board. Noteworthy growth is also evident in categories such as Optical Whitening Agents and Solvent-Based Coloring Matters: Yellows, indicating emerging trends or shifts in demand within the industry. Overall, the data underscores a favourable outlook for India's dye exports, presenting opportunities for exporters to capitalize on increasing global demand for these products.

Table N0: 04 TOP EXPORTS OF DYE INTERMEDIATES		Value in USD		
Million				
SI No	Products	2020-21	2021-22	% Growth
1	DICHLOROANILINE	36.22	37.69	4.06
2	ISOBUTYL BENZENE	28.01	18.41	-34.27
3	ORTHO TOLUIDINE	6.23	9.94	59.55
4	SATURATED METHANOL (METHYL ALCOHOL)	3.52	8.12	130.68
5	OTHER TOLUIDINES & THEIR DERIVATIVES; SALTS THEREOF	13.14	13.78	4.87
6	PARACHLORO ANILINE	4.71	9.61	104.03
7	PARANITROANILINE	5.04	8.89	76.39
8	GAMMA ACID	4.57	6.87	50.33
9	DIMETHYL TOLUIDINE	2.8	3.55	26.79
10	PARA TOLUIDINE	0.95	2.98	213.68
11	2-4-5-TRICHLORO ANILINE	4.02	5.61	39.55
12	H-ACID	11.44	14.49	26.66
13	DIPENTENE	1.81	2.69	48.62
14	DIMETHYL ANILINE	1.57	2.35	49.68
15	PHENYL ALPHA NAPHTHALENE	1.77	2.62	48.02
16	NAPHTHALENE SULPHONIC ACID	1.72	1.99	15.7
17	ANTHRANILIC ACID AND ITS SALTS	1.17	3.56	204.27
18	BRONNERS ACID	1.26	1.28	1.59
19	BENZENE SULPHONIC ACID	0.31	1.55	400
20	DIPHENYLMETHANE	0.74	1.16	56.76

Source: DGCIS&S

The table provides data on the top exports of dye intermediates from India, comparing their values in USD million for the fiscal years 2020-2021 and 2021-2022, along with the percentage growth.

The top exports of dye intermediates exhibit varying trends in terms of growth and value. While some products experienced significant growth rates, others showed declines or marginal changes. Notably, ortho-toluidine and Para Toluidine recorded substantial growth rates of 59.55% and 213.68%, respectively, indicating a strong demand for these intermediates in the global market. Saturated Methanol also demonstrated remarkable growth at 130.68%, suggesting increased utilization in dye production processes. Conversely, Isobutyl Benzene experienced a notable decline of -34.27%, reflecting potential shifts in market demand or production dynamics. Overall, the data underscores the dynamic nature of the dye intermediate export market, with opportunities for exporters to capitalize on high-growth products while navigating changes in demand for others.

SL NO	Product	2020-21	2021-22	% Growth
1	CARBON BLACK	111.75	290.04	159.54
2	SODIUM HYDROXIDE IN AQUEOUS SOLUTION	22.91	104.89	357.84
3	FLAKES OF SODIUM HYDROXIDE	51.99	68.21	31.2
4	SILICON DIOXIDE	52.86	71.71	35.66
5	OTHER CHLORIDE OXIDES AND CHLORIDE HYDROXIDES	45.48	50.35	10.71
6	OTHER COMPOUNDS INORGANIC /ORGANIC OF RARE EARTH METALS	26.17	57.01	117.84
7	DISODIUM CARBONATE	25.52	58.92	130.88
8	OTHER SULPHATE N.E.S.	23.94	49.92	108.52
9	BROMINE	26.69	56.96	113.41
10	CHLORIDES OF ALUMINIUM	41.87	53.33	27.37
11	OTHER CHLORIDES	27.83	44.01	58.14
12	IODATES AND PERIODATES	26.18	31.42	20.02
13	OTHER BROMIDES AND OXYBROMIDES	20.94	23.76	13.47
14	HYDROGEN PEROXIDE W/N SOLIDIFIED WITH UREA	1.43	2.68	87.41

15	OTHER COMMERCIAL CALCIUM HYPOCHLORITE (BLEACHING PASTE/POWDER)	10.43	12.24	17.35
16	SODIUM MOLYBDATE	13.98	29.28	109.44
17	CALCIUM CHLORIDE	6.2	8.71	40.48
18	OTHER FLUORIDES	13.52	18.59	37.5
19	SODIUM SULPHOXYLATE (INCLUDING SODIUM FORMALDEHYDE SULPHOXYLATE)	17.38	25.94	49.25
20	ALUMINIUM HYDROXIDE	19.91	18.52	-6.98
Source: DGCI&S				

The table illustrates the top exports of inorganic chemicals from India, comparing their values in USD million for the fiscal years 2020-2021 and 2021-2022, alongside the percentage growth. Among the findings, Carbon Black emerges as the standout export with an impressive growth rate of 159.54%, indicating robust international demand for this product. Similarly, Sodium Hydroxide in Aqueous Solution exhibits substantial growth at 357.84%, reflecting a surge in global demand. Other notable performers include Disodium Carbonate Light (Soda Ash), Bromine, and Sodium Molybdate, suggesting consistent demand and export potential. However, the performance of Aluminum Hydroxide saw a slight decline of -6.98%, implying potential challenges or shifts in market dynamics for this chemical. The diversity of products, ranging from Silicon Dioxide to Hydrogen Peroxide, underscores the breadth of India's export offerings in the inorganic chemicals sector. Overall, the data highlights both opportunities and challenges, emphasizing the need for exporters to adapt to changing market conditions while capitalizing on growth opportunities in the global market for inorganic chemicals.

SL No	Product	2020-21	2021-22	% Growth
1	BENZENE	755.33	1863.4	146.7
2	P-XYLENE	1553.88	1948.83	25.42
3	OTHER COMPNDSCNTNG AN UNFUSED IMIDAZOLE RING	238.17	257.94	8.3
4	OTHER DERIVATIVES OF PYRIDINE	173.13	222.76	28.67
5	OTHER ORGANIC/INORGANIC COMPOUNDS	154.72	249.75	61.42
6	OTHER IMINES AND THEIR DERIVATIVES SALTS THEREOF	147.45	144.72	-1.85

7	KETONE-PHENOLS AND KETONES WITH OTHER OXYGEN FUNCTION	62.75	76.5	21.91
8	O-XYLENE	171.37	199.01	16.13
9	OTHER LACTONES	75.22	110.24	46.56
10	ETHYL ACETATE	94.31	178.65	89.43
11	BUTA-1 3-DIENE AND ISOPRENE	97.92	120.73	23.29
12	OTHER AROMATIC POLYCARBOXYLIC ACIDS THEIR ANHYDRIDES HALIDES PEROXIDES PEROXYACIDS AND THEIR DERIVATIVES	69.33	89.18	28.63
13	OTHER AROMATIC MONOCARBOXYLIC ACIDS THEIR ANHYDRIDES HALIDES PEROXIDES PEROXYACIDS AND THEIR DERIVATIVES	80.58	109.76	36.21
14	OTHER DIAZO-AZO OR AZOXY COMPOUNDS	84.4	105.51	25.01
15	OTHER CYCLANIC CYCLNIC/CYCLOTERPENIC KETONES WITHOUT OTHER OXYGEN FUNCTION	92.85	102.93	10.86
16	OTHER NITRILE- FUNCTION COMPOUNDS	80.7	99.58	23.4
17	OTHER COMPOUND CONTAINING AN UNFUSED TRIAZINE RING	69.42	83.38	20.11
18	OTHER AROMATIC POLYAMINES & THEIR DERIVATIVES & SALTS	57.99	100.34	73.03
19	OTHER ACYCLIC KETONES WITHOUT OTHER OXYGEN FUNCTION	66.4	71.81	8.15
20	OTHER HALOGENATED DERIVATIVES OF AROMATIC HYDROCARBONS	60.01	80.82	34.68
Source: DGCI&S				

The table presents an overview of India's top exports in organic chemicals, comparing their values in USD million for the fiscal years 2020-2021 and 2021-2022, along with the percentage growth. Notably, Benzene emerges as the leading export with a remarkable growth rate of 146.7%, signaling a surge in global demand. Following closely is P-Xylene, showing steady growth at 25.42%. The data reflects a diverse range of organic compounds, with growth rates varying across different products. While some, like Other Derivatives of Pyridine and Other Organic/Inorganic Compounds, experience robust growth, others demonstrate modest or declining trends. This diversity suggests opportunities for exporters to capitalize on specific segments showing substantial growth. However, it also highlights the importance of adapting to varying market conditions and addressing potential challenges within the organic chemical sector. Overall, the data underscores the dynamic nature of India's organic chemical exports, presenting both opportunities and challenges for exporters in this sector.

Table No:07 TOP EXPORTS OF AGRO CHEMICAL		Value in USD Million		
SL No	Product	2020-21	2021-22	% Growth
1	OTHER HERBICIDES ANTI-S-SPROUTING PRODUCTS AND PLANT GROWTH REGULATORS	1157.48	1605.39	38.7
2	OTHER INSECTICIDE N.E.S.	1125.75	1453.7	29.13
3	OTHER FUNGICIDES	670.79	958.41	42.88
4	OTHER	142.38	232.91	63.58
5	DICHLOROPHENOXY ACTC ACD & ITS ESTERS	44.93	107.89	140.13
6	WEEDICIDES AND WEED KILLING AGENTS	75.71	98.02	29.47
7	CYPERMETHRIN TECHNICAL GRADE	143.79	169.89	18.15
8	DISINFECTANTS	37.32	64.12	71.81
9	SYNTHETIC PYRETHRUM	22.22	29.21	31.46
10	PESTICIDES NOT ELSEWHERE SPECIFIED OR INCLUDED	31.7	32.25	1.74
11	OTHER SIMILAR PRODUCTS N.E.S.	36.61	41.63	13.71
12	REPELLANT FOR INSECTS SUCH AS FLIES MOSQUITO	19.81	17.71	-10.6
13	METHYL BROMIDE	13.41	14.89	11.04
14	PLANT GROWTH REGULATORS	9.39	11.54	22.9
15	MANEB	3.54	6.23	75.99
16	COPPER OXYCHLORIDE	6.96	10.77	54.74
17	OTHER DDT	1.28	3	134.38
18	MELATHION	6.88	12.13	76.31
19	QUINALPHOS	3.97	7.83	97.23

Source: DGCI&S

The table illustrates India's top exports in the agrochemical sector, showcasing their values in USD million for the fiscal years 2020-2021 and 2021-2022, alongside the percentage growth. The data reveals a robust growth trend across various categories, indicating a thriving export market. Notably, products like Other Herbicides, Anti-Sprouting Products, and Plant Growth Regulators witness substantial growth of 38.7%, followed by Other Fungicides and Other Insecticides with growth rates of 42.88% and 29.13% respectively. This growth signifies increasing global demand for agrochemicals and reflects India's competitiveness in this sector. The table also portrays a diverse range of agrochemical products, including Weed Killers, Disinfectants, and Synthetic Pyrethrum, highlighting the breadth of India's export offerings. While most products

exhibit positive growth, some experience modest gains or slight declines, indicating the need for exporters to adapt to varying market dynamics. Overall, the data underscores opportunities for exporters to capitalize on the growing demand for agrochemicals while navigating challenges and exploring avenues for further expansion in the global market.

Table No: 08 TOP EXPORTS OF COSMETICS & TOILETRIES				Value
in USD Million				
SL No	Product	2020-21	2021-22	% Growth
1	OTHER INDUSTRIAL MONOCARBOXYLIC FATTY ACID	123.96	233.39	88.28
2	OTHER BEAUTY MAKE-UP PREPARATION	80.43	96.57	20.07
3	SYNTHETIC PERFUMERY COMPOUNDS	100.13	122.01	21.85
4	OTHER PERFUMES AND TOILET WATERS	41.13	50.59	23
5	OTHER FLOURINATED DERIVTVS	82.47	81	-1.78
6	DENTIFRICES IN PASTE (TOOTH PASTE)	62.43	67.91	8.78
7	OTHER TOILET SOAPS (INCLUDING MEDICATED PRODUCTS)	63.16	63.48	0.51
8	PERFUMES CONTAINING SPIRIT FOR RETAIL SALE	56.13	59.79	6.52
9	HCO FATTY ACID(INCLUDING 12-HYDROXY STEARIC ACID)	75.97	77.62	2.17
10	HAIR DYES(NATURAL HERBAL OR SYNTHETICS)	66.08	64.28	-2.72
11	SYNTHETIC FLAVOURING ESSENCES	52.45	58.24	11.04
12	CREAM FACE	34.57	49.03	41.83
13	OTHER HAIR SHAMPOOS (NON SPIRITUOUS)	35.02	41.41	18.25
14	OTHER (OTHER PREPARATIONS) NES	22.84	65.05	184.81
15	PERSONAL DEODORANT AND ANTIPERSPIRANTS	19.3	28.48	47.56
16	OTHER TEXTILE ASSISTANTS	28.42	41.45	45.85
17	OTHER ODORIFERROUS PREPNS USED FOR DEODORING ROOM-OTHERS (EXCL.AGARBATTI)	30.12	37.83	25.6
18	HAIR OIL (PERFUMED)	23.62	25.68	8.72
19	MOISTURISING LOTION	12.12	19.48	60.73
20	OTHR PRPNS FOR USE ON HAIR N.E.S.	15.95	20.43	28.09
Source : DGCI&S				

The table delineates the significant growth and diverse landscape of India's exports in the cosmetics and toiletries sector. In the fiscal year 2021-2022, several products witnessed remarkable expansion, exemplified by the exponential growth of Other Preparations (NES), soaring by an astounding 184.81% from \$22.84 million to \$65.05 million. Moreover, Other Industrial Monocarboxylic Fatty Acid surged by 88.28%, escalating from \$123.96 million to \$233.39 million, indicating a substantial increase in demand for this product category. Additionally, Moisturizing Lotion experienced notable growth, soaring by 60.73%, from \$12.12 million to \$19.48 million. Such trends underscore India's competitiveness in producing cosmetics and toiletries, as well as the robust global demand for these products. Despite overall positive growth, Hair Dyes witnessed a minor decline of -2.72%, reflecting potential market fluctuations or shifts in consumer preferences. These facts underscore the nuanced dynamics within the cosmetics and toiletries sector, presenting both opportunities and challenges for exporters aiming to capitalize on the industry's growth trajectory while navigating evolving market conditions.

Table No 09 TOP EXPORTS OF ESSENTIAL OILS		Value in USD Million		
SL No	Product	2020-21	2021-22	% Growth
1	OTHER MIXTURE OF AROMATIC CHEMICALS AND ESSENTIAL OILS AS PERFUME BASE	59.74	57.18	-4.29
2	AQUEOUS DISTILLATES OF ESSENTIAL OILS N.E.S.	2.39	52.46	2094.98
3	ESSENTIAL OILS OF GERANIUM	44.36	46	3.7
4	OTHER AQUEOUS SOLUTION OF ESSENTIAL OILS.	29.68	38.63	30.15
5	OTHER FLAVOURING ESSENCES USED IN THE FOOD OR DRINK INDUSTRIES	32.1	39.39	22.71
6	ESSENCE OF AMBRETTOLE	8.92	17.96	101.35
77	DAVANA OIL	5.39	7.69	42.67
8	LEMONGRASS OIL	11.05	13.77	24.62
9	CITRONELLA OIL CEYLON TYPE INCLUDING & CONCENTRATE	12.87	8.17	-36.52
10	SYNTHETIC ESSENTIAL OILS	7.12	8.54	19.94
11	ROSE OIL	0.78	0.96	23.08
12	EUCALYPTUS OIL	6.68	5.32	-20.36
13	TUBEROSE CONCENTRATES	2.44	2.37	-2.87
14	FLAVOURING ESSENCES ALL TYPES INCLUDING THOSE FOR LIQUORS (RESINOIDS)	3.04	2.38	-21.71
15	SANDALWOOD OIL	1.25	1.74	39.2
16	PALMOROSA OIL	1.75	2.73	56

17	OTHER TERPENIC BY PRODUCTS OF DETERPENATION OF ESSENTIAL OILS	0.54	1.14	111.11
18	CEDARWOOD OIL	0.64	1.04	62.5
19	RESINOIDS OTHER	0.41	0.87	112.2
20	CITRONELLA OIL JAVA TYPE	0.54	0.43	-20.37

Source: **DGCI&S**

The table provides a comprehensive overview of India's essential oils exports, revealing noteworthy trends and growth patterns within the sector. A striking observation is the exponential surge in Aqueous Distillates of Essential Oils N.E.S., which soared by an astonishing 2094.98%, catapulting from \$2.39 million to \$52.46 million. This surge signifies a remarkable increase in global demand for these products. Concurrently, Essential Oils of Geranium and Other Aqueous Solutions of Essential Oils demonstrate steady growth rates of 3.7% and 30.15% respectively, indicating sustained demand in core product categories. Notably, Essence of Ambrettolie and Lemongrass Oil experienced significant growth rates of 101.35% and 24.62%, suggesting rising global interest in these specific oils. However, some oils, like Citronella Oil Ceylon Type and Eucalyptus Oil, witnessed declines of -36.52% and -20.36% respectively, reflecting potential fluctuations in market demand or shifting consumer preferences. The data showcases the diverse range of essential oils exported by India, ranging from Rose Oil to Cedarwood Oil, highlighting the country's versatility in catering to global market demands. Overall, while certain oils witness remarkable growth, others face challenges, emphasizing the importance of adaptability and market intelligence for exporters in the essential oils industry.

Table No: 10 TOP EXPORTS OF CASTOR OIL		Value in USD		
Million				
SL No	Product	2020-21	2021-22	% Growth
1	CASTOR OIL AND ITS FRCTNS OTHR THN EDIBLE GRADE	846.83	1080.74	27.62
2	OTHER HYDROGENATED CASTOR OIL (OPAL WAX)	68.13	92.24	35.39
3	OTHER CASTOR OIL DEHYDRATED	1.44	2.17	50.69
4	CASTOR OIL & ITS FRACTIONS (EDIBLE GRADE)	0.83	0.34	-59.04

Source: DGCI&S

The table illustrates India's top exports in the castor oil industry, detailing their values in USD million for the fiscal years 2020-2021 and 2021-2022, alongside the percentage growth. Notably, Castor Oil and its Fractions Other than Edible Grade showcase

significant growth, surging by 27.62% from \$846.83 million to \$1080.74 million, indicating heightened demand for non-edible castor oil fractions in industrial applications. Concurrently, Other Hydrogenated Castor Oil (Opal Wax) experiences a notable increase of 35.39%, rising from \$68.13 million to \$92.24 million, reflecting growing utilization in cosmetics, pharmaceuticals, and industrial sectors. Moreover, Other Castor Oil Dehydrated witnessed a substantial growth rate of 50.69%, reaching \$2.17 million, signifying an emerging demand for specialized industrial applications. However, the edible grade segment sees a sharp decline of -59.04%, dropping from \$0.83 million to \$0.34 million, indicating potential shifts in market preferences or consumption patterns. These trends underscore the varied applications and demand dynamics within the castor oil industry, presenting opportunities for exporters to capitalize on the burgeoning demand for industrial-grade castor oil derivatives while navigating challenges in the edible-grade segment.

9. Key Findings:

- India's chemical industry is significant globally, ranking sixth worldwide and third in Asia. Valued at US\$ 178 billion, it is expected to reach US\$ 300 billion by 2025.
- India ranks 14th in global chemical exports, contributing 2.5% to global sales.
- Total chemical and petrochemical exports fluctuated over the years.
- Notable growth in some sectors, such as inorganic chemicals and agrochemicals.
- Declines in organic chemicals and specialty chemicals.
- Dye exports generally grew, led by Pigment Blue 15 and Reactive Blacks.
- Dye intermediate exports varied, with notable growth in Ortho Toluidine and Para Toluidine.
- Inorganic chemical exports surged, driven by Carbon Black and Sodium Hydroxide.
- Organic chemical exports saw growth, particularly in Benzene and P-Xylene.
- Agrochemical exports increased, with strong demand for herbicides and fungicides.
- Cosmetics & toiletries exports expanded, with notable growth in Industrial Monocarboxylic Fatty Acid and Moisturizing Lotion.
- Essential oil exports showed mixed trends, with significant growth in Aqueous Distillates of Essential Oils and Essence of Ambrettolie.
- Castor oil exports witnessed growth in non-edible grade fractions.

10. Discussion and Conclusion

Analyzed data provides a comprehensive overview of India's chemical industry and its performance in global markets. India ranks prominently in various chemical sectors, such as agrochemicals, petrochemicals, and specialty chemicals, contributing significantly to both domestic and international markets. The industry's value is projected to reach US\$ 300 billion by 2025, reflecting its substantial growth potential.

Examining export performance, the data highlights fluctuations in export values and volumes across different chemical categories over the years. Notable growth areas include inorganic chemicals, agrochemicals, and essential oils, indicating robust demand and market opportunities. However, some segments experienced declines or marginal growth, suggesting the need for strategic adaptation to changing market dynamics.

Specifically, the analysis delves into various chemical subcategories, such as dyes, dye intermediates, inorganic chemicals, organic chemicals, agrochemicals, cosmetics, toiletries, and essential oils. Each category demonstrates unique trends and growth patterns, influenced by factors like global demand, market competition, and regulatory changes.

For instance, inorganic chemicals like carbon black and sodium hydroxide witnessed substantial growth, driven by increased international demand. Similarly, agrochemicals experienced significant growth, reflecting rising agricultural activities and the need for crop protection solutions.

Furthermore, the analysis provides insights into India's exports of cosmetics, toiletries, and essential oils, showcasing the country's competitiveness in these segments. While some products saw remarkable growth, others faced challenges, emphasizing the importance of market intelligence and adaptability for exporters.

Overall, the data underscores the dynamic nature of India's chemical industry and its role in the global market. It highlights opportunities for exporters to capitalize on growing demand while navigating challenges and emerging trends effectively.

The government must strengthen the Chemical and Petrochemical Development Scheme (CPDS) to effectively enhance the industry's capabilities. Skill development initiatives should be prioritized to meet industry demands, and policies related to chemical manufacturing need to be streamlined to encourage growth and investment. Additionally, while centralized research institutions like the Centre of Excellence and CIPET play a crucial role, there's a risk of overlooking the innovative potential of smaller players in the field. Therefore, it's imperative to address these challenges to ensure the long-term sustainability and success of initiatives aimed at bolstering the chemical industry in India. This requires a more inclusive approach that leverages the strengths of both large institutions and smaller enterprises to drive innovation and competitiveness in the sector to challenge global competition in the domain.

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