

## **CHEMICAL AND PETROCHEMICAL INDUSTRY**

## 1. OVERVIEW

### Historical development

Chemical industry is one of the oldest industries in India. The industry, including petrochemicals, and alcohol-based chemicals, has grown at a pace outperforming the overall growth of the industry.

The Chemicals Industry comprises both small and large scale units. The fiscal concessions granted to small sector in mid-eighties led to establishment of large number of units in the Small Scale Industry (SSI) sector. Currently, the Indian Chemical Industry is in the midst of major restructuring and consolidation phase. With the shift in emphasis on product innovation, brand building and environmental friendliness, this industry is increasingly moving towards greater customer-orientation. Even though India enjoys an abundant supply of basic raw materials, it will have to build upon technical services and marketing capabilities to face global competition and increase its share of exports.

Chemical fertilizers and pesticides played an important role in the "Green Revolution" during the 1960s and 1970s. The consumption of pesticides in India is low in comparison to other countries. Indian exports of agrochemicals have shown an impressive growth over the last five years. The key export destination markets are USA, UK, France, Netherlands, Belgium, Spain, South Africa, Bangladesh, Malaysia and Singapore.

The Government is promoting research on the use of alternative and unarmful pesticides using neem seeds. A country programme entitled "Development and Production of Neem Products as Environment Friendly Pesticides" is being undertaken by the Department of Chemicals & Petrochemicals with the financial assistance of United Nations Development Programme (UNDP)/ United Nations Industrial Development Organization (UNIDO). The project is being implemented at two locations viz., Nimpith in West Bengal and Nagpur in Maharashtra to promote production, processing and use of neem-based products, thereby aiding wasteland development, generating rural employment and providing farmers with eco-friendly/bio-degradable pesticides.

Petrochemical industry is a cyclical industry. Globally the petrochemical industry is characterized by sluggish demand and volatile feedstock prices. In India, consumption of petrochemical products is still one of the lowest in the world. For example in case of polyester, India's per capita consumption is 1.4 kg compared to 6.6 kg for China and 3.3 kg for the world. In case of polymers, per capita consumption of India is 4 kg and is about a fifth of the world. Demand for the petrochemicals products has grown in double digits for a long period.

### **Current scenario**

The global chemical market is estimated at approximately USD 1.7 trillion. Western Europe is the largest chemical-producing region followed by North America and Asia.

The Indian Chemical Industry ranks 12<sup>th</sup> by volume in the world production of chemicals. The industry's current turnover is about USD 30.8 billion which is 14 per cent of the total manufacturing output of the country.

In terms of consumption, the chemical industry is its own largest customer and accounts for approximately 33 per cent of the consumption. In most cases, basic chemicals undergo several processing stages to be converted into downstream chemicals. These in turn are used for industrial applications, agriculture, or directly for consumer markets. Industrial and agricultural uses of chemicals include auxiliary materials such as adhesives, unprocessed plastics, dyes and fertilizers, while uses within the consumer sector include pharmaceuticals, cosmetics, household products, paints, etc.

India also produces a large number of fine and speciality chemicals, which have very specific uses and are essential for increasing industrial production. These find wide usage as food additives, pigments, polymer additives, anti-oxidants in the rubber industry, etc. Some of the important manufacturers of speciality chemicals include NOCIL, Bayer (India), ICI (India), Hico Products and Colourchem.

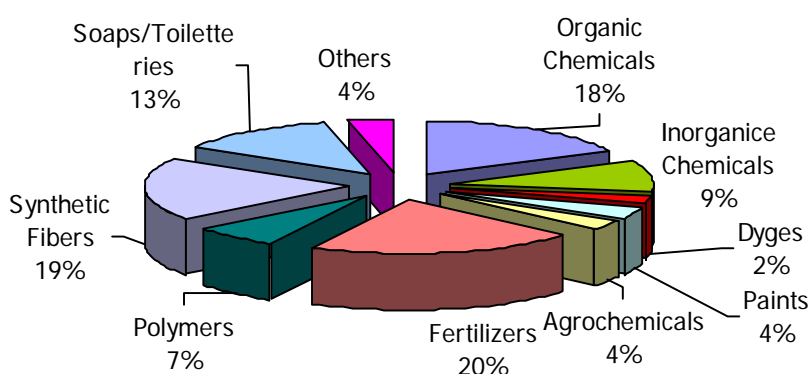
The Dyestuff sector is one of the important segments of the chemicals industry in India, having forward and backward linkages with a variety of sectors like textiles, leather, paper, plastics, printing ink and foodstuffs. The textile industry accounts for the largest consumption of dyestuffs at nearly 80 per cent. From being importers and distributors in the 1950's, it has now emerged as a very strong industry and a major foreign exchange earner. India has emerged as a global supplier of dyestuff and dyes intermediates, particularly for reactive, acid, vat and direct dyes. India accounts for 6 per cent of the world production of dyes.

## 2. CURRENT STATUS

### Industry Segments

The wide and diverse spectrum of products can be broken down into a number of categories, including inorganic and organic (commodity) chemicals, drugs and pharmaceuticals, plastics and petrochemicals, dyes and pigments, fine and specialty chemicals, pesticides and agrochemicals, and fertilizers.

### Structure of Indian Chemical Industry



#### 2.1.1 Basic Inorganic and Organic Chemical Industry

The Basic inorganic chemical and organic chemical industry constitutes a major segment of the country's economy. Important chemicals in this category are Soda Ash, Caustic Soda, Liquid Chlorine, Calcium Carbide, Acetic Acid, Methanol, Formaldehyde, Phenol, Acetone.

These are raw materials for industries like detergents, toothpaste, plastics, drugs, petroleum refining, etc. 10 per cent of the Chlor-Caustic Plants use Membrane Cell Technology, which will find higher usage, as no new capacities are allowed for the mercury cell process

#### 2.1.2 Drugs & Pharmaceuticals

The Indian Pharmaceutical Industry is the largest in the developing world. The industry currently produces a wide range of bulk drugs. In fact, India is currently a world leader in manufacture and export of basic drugs such as ethambutol and ibuprofen.

300 bulk drugs & formulation based on them are manufactured in the country. There are 10,000 manufacturing units, of which 290 units are in the large-scale sector, 45 Multi-National Companies (MNCs) have manufacturing bases here.

India is emerging as one of the largest and cheapest producers of pharmaceuticals in the world, accounting for nearly 8.5 per cent of the world's drug requirements in terms of volume, and ranks amongst the top 15 drug manufacturing countries in the world. India being a signatory to the GATT accord, (and the TRIPs agreement therein) patent protection will be provided under the treaty obligations.

### 2.1.3 Pesticides & Agrochemicals

India is currently the largest manufacturer of Pesticides in Asia, second only to Japan. The pesticides demand from the agriculture sector is expected to go up to 97,000 tonnes by the year 2000. More than 60 technical grade pesticide is manufactured indigenously. Some 125 units are engaged in the manufacture of the above and over 500 units are making pesticide formulations.

In agrochemical, we manufacture significant quantities of synthetic pyrethroids, such as fenvalerate and cypermethrin, endosulphane, and organophosphate range of agrochemicals, including monocrotophos. India is also a dominant producer of isoproturon, a weedicide accounting for nearly 25 per cent of the world-wide production.

The Indian pesticide industry has advanced significantly in recent years, producing more than 1,000 tons of pesticides annually. India is the 13th largest exporter of pesticides and disinfectants in the world, and in terms of volume, is the 12th largest producer of chemicals. However the average Indian consumption is very low, merely 1/20<sup>th</sup> of world average. Consumption varies depending on crop and region Cash crops like sugarcane, tobacco etc. are the major consumers of pesticides (above 60 per cent)

There are two types of producers out of them there are about 40 Technical producers and above 500 formulators. United Phosphorus, Rallis and Excel are the major Indian players. Multinational like Hoechst, Agrevo, Novartis, Bayer etc has significant share in the market.

### 2.1.4 Petrochemicals

The petrochemical industry of India is less than 40 years old. Petrochemicals cover basic chemicals like Ethylene, Propylene, Benzene and Xylene. The other major components are the intermediates like MEG, PAN and LAB etc, Synthetic fibres like Nylon, PSF and PFY, Polymers like LDPE/HDPE, PVC, Polyester and PET etc and Synthetic rubber like SBR, PBR. The sector has a significant growth potential. Although the current per capita consumption of petrochemicals products is low, the demand for the same is growing: The major players in this field includes Reliance, Indian Petrochemicals Limited (IPCL), National Organic Chemical Industry Ltd (NOCIL) and Gas Authority of India Ltd (GAIL) etc.

### 2.1.5 Dyes & Pigments

There are about 50 units in the organised sector and about 900 units in the small scale sector. The Installed Capacity of the organized sector is 37,000 MTA while the small scale sector has an installed capacity of 10,000 MTA. The Market is highly fragmented.

About 25 large and medium players have hold over 50 per cent of the dyes and pigments market and about 2000 players in unorganized sector contributes to the rest.

Nearly 80 per cent of the dyes manufactured is utilised by the textile industry, with the balance going to into paints, printing inks, rubber & leather. Just like Agrochemicals, per capita consumption of dyes too is very low (400 gms) as compared to developed countries like USA (15 kgs). However India is a major exporter of dyes, mostly due to ban of production of some of the dyes and intermediates in the developed countries due to pollution

#### Major Players

- Paints - Asian Paints, Goodlass Nerolac, ICI, Courtalds, Jenson & Nicholson
- Dyes & Intermediates - Color Chem (Hoechst), Clariant, IDI, Atul, Mardia etc.
- Inks - Coates, Hindustan Inks, Sakata

### 2.1.6 Fine & Specialty Chemicals

70 per cent of the Fine Chemicals produced in India find their way into the Pharmaceutical and Agrochemical sectors. Performance chemicals geared to customer need are being developed locally particularly since there is growing demand for Speciality chemicals like Sunscreens, Antioxidants, Biocides, etc.

Manufacturers of Fine Chemicals and specialities have major strengths in basic research facilities available with CSIR laboratories such as NCL, IICT & RRLs as also corporate R & D centres. This ensures that development of process know-how; plant process design and engineers, detailed engineering design, commissioning assistance and even consultancy for re-engineering are available at low cost. This segment is also highly segmented with large number of players. Major Indian players are ION Exchange, Balmer Lawrie, Dai Ichi Karkaria. etc. The multinationals like Ciba, Hoechst, Foseco, Nalco Chemicals, Clariant, ICI etc too have significant share in the fast growing market.

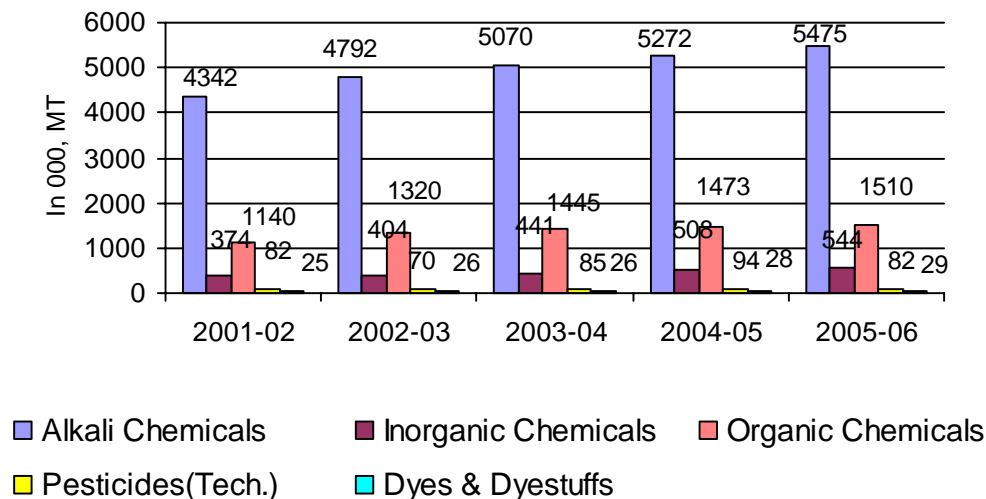
### 2.1.7 Fertilizers

The Indian fertilizer industry has emerged as the fourth largest producer of fertilizers in the world after China, USA, Russia. Nitrogenous and phosphatic fertilizers are produced indigenously, while requests for potassic fertilizers are met through imports.

India has achieved near self-sufficiency in the inputs for the production of nitrogenous fertilizers, but for the production of phosphatic fertilizers, the country continues to rely on imports of raw materials (rock phosphate and sulphur and for intermediates such as phosphoric acid).

## 2.2 Production Trends of Major Chemicals

### Production of Major Chemicals During 2001-02 to 2005-06



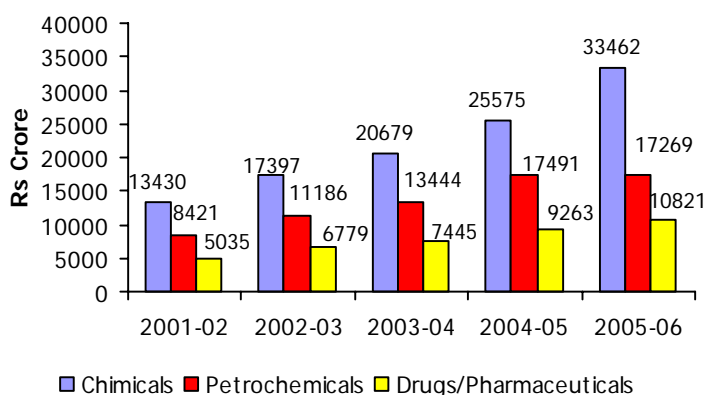
The annual growth rate in production of basic chemicals during 2002-06 has been 6.4 per cent despite that fact that no major capacity additions have taken place in respect of any of these chemical groups during this period. Inorganic, organic and alkali chemicals however registered an annual growth of 9.8 per cent, 7.3 per cent and 6.0 per cent respectively during this period. Production of pesticides has tended to fluctuate from year to year basis with 2005-06 production being at the level of 2001-02. Also there has been a very little growth in production of major chemicals during 2005-06 production being at the level of 2001-02. Also there has been a very little growth in production of dyes and dyestuff (3.8 per cent).

### 2.3 External Trade in Chemicals

Trade in chemicals to and from India in the recent years has increased substantially. Though earlier the exports were to countries of South East Asia, Africa, this is now changing. Indian Chemicals have markets in countries such as USA, UK, Germany, France, Japan, etc.

WTO regime has brought structural changes in external trade. There has been reduction in tariff. However, non-tariff barriers like environmental issues, child labour, pesticide residuals in agriculture produce etc are still used to influence imports into the developed countries.

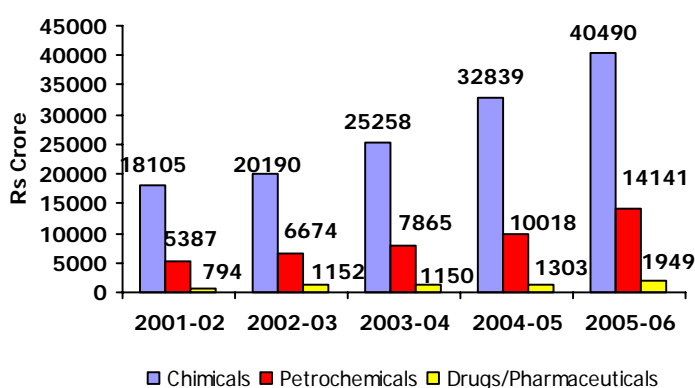
**India's Growing Chemical Export**



During 2001-06, there has been an annual growth of 23per cent in exports of all chemicals as against 21.6per cent in total exports. On the other hand, imports of all chemicals registered a growth of 23.5 per cent against 28.1 per cent growth in total imports of the country. During this period share of chemicals in total exports increased from 12.9per cent in 2001-02 to 13.5per cent in 2005-06 whereas in case of imports it declined from 9.9per cent to 8.6per cent during the said period.

It may be noted that there has been a positive trade balance in chemicals since 2001-02 and it stood at Rs 4972 crore in 2005-06 registering an annual growth of 17.6per cent during 2001-06.

**India's Chemical Import**



With initiation of economic reforms in 1991, industrial policy has been liberalized and except for few sectors, licensing has been discontinued. From August 1991 to June 2006, 66071 proposals amounting to Rs 2119427 crore have been filed. The share of chemical sector in total proposed investment is 11.85per cent and the Basic chemicals and petrochemicals account for 14.66per cent of the total proposed investment.

### 3. INVESTMENT POLICY AND INITIATIVES

#### 3.1 Policy and initiatives to promote the sector

With a special focus on modernization, the Indian government takes an active role in promoting and advancing the domestic chemical industry. The Department of Chemicals & Petro-Chemicals, which has been part of the Ministry of Chemicals and Fertilizers since 1991, is responsible for policy, planning, development, and regulation of the industry.

In the private sector, numerous organizations, including the Indian Chemical Manufacturers Association, the Chemicals and Petrochemicals Manufacturers Association, and the Pesticides Manufacturers and Formulators Association of India, all work to promote the growth of the industry and the export of Indian chemicals. The Indian Chemical Manufacturers Association, for example, represents a large number of Indian companies that produce and export a number of chemicals that have legitimate commercial applications, but also can be used as precursors and intermediates for chemical weapons production.

#### 3.2 Foreign Direct Investment (FDI) Policies

The procedure has been simplified for facilitating foreign direct investment. Most of the chemical items fall under the RBI automatic approval route for FDI/NRI/OCB investment up to 100% except the following

- Activities / items that require an industrial license
- Proposals in which the foreign collaborator has previous / existing venture/tie up in India in the same or allied field
- All proposals relating to acquisition of shares in an existing Indian company by a foreign/NRI investor
- All proposals falling outside notified sectoral policy/caps or under sectors in which FDI is not permitted

For other industries, Government approval is accorded through Foreign Investment Promotion Board (FIPB).

#### 4. INVESTMENT OPPORTUNITIES/ HURDLES IN THE SECTOR

Due to its low cost infrastructure, India has potential of growth in exports. According to a report by McKinsey, India's manufactured exports have the potential to rise from \$40 bn last year to \$300 bn by 2015. This defines an investment of \$50 bn in chemical industry alone.

India has the capacity for major value addition being close to Middle East. This is a cheap and abundant source for petrochemical feedstock.

In certain categories of chemicals India does have advantage for exports (dyes, pharmaceuticals and agrochemicals) by creating strategic alliances with countries like Russia and CIS countries. With the know-how available in the country there is a tremendous potential to grow and increase exports in dyestuff and agrochemical market.

Availability and abundance of raw materials for titanium dioxide and agro-based products like castor oil offer an opportunity to generate significant value addition. This, however, would require substituting their exports in raw form by manufacturing higher value derivatives.

The major challenges are quest for feedstock and knowledge management. Traditionally naphtha-based crackers have been providing feedstock to the industry. Today, they are being replaced by new gas-based crackers. India and China will pose a stiff competition to the Middle East due to the vibrant exports and large unexplored reserves of oil and gas. Indian government is acting as a facilitator by setting up LNG terminals and acquiring equity interests in overseas proven oil reserves. This will fuel rapid growth in chemical industry. The government is also engaged in the formulation of a National Policy on Pharmaceuticals and mega-industrial chemical estates.