

Pharmaceutical Machinery Manufacturing Indian & Global Markets

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Abstract: *Pharmaceutical machinery manufacturing industry has been growing very rapidly, as there is a huge demand in various drugs in the market. This has led to changes on economy of industrial growth compared to previous years. Countries like India the change has been very evident as growth of pharmaceutical is indicated to 18% to previous years. This article would cover on market how pharmaceutical engineering has become one of the important economic considerations in due course of time.*

Keywords: Pharmaceutical, machinery, Tableting, Granulation.

1. Introduction: Industrial Overview

Along with the development of pharmaceutical companies, Pharmaceutical Machinery manufacturers are also advances themselves to meet the challenges of pharmaceutical industries. Most of the leaders in the field are looking towards advanced market like US and Europe for their pharma products. As these countries mandate proper validation of the products the importance of machineries which incorporate advanced technologies are also increasing. For validation of the products, the machine also should be fully equipped.

Now the machine manufacturers are upgrading themselves by investing in knowledge. Many pharmaceutical machinery manufacturers often visit in the various countries just to observe the latest development in the machines and to follow latest development.

In addition to this there are also other visible trends can explain committed interest of Indian machinery manufacturers further:

- Machine makers are going for CNC machine to get quality output
- Using more and more gadgets in the machine, like, VFD, PLC etc.
- Many firms are getting ISO approval
- Importing of prototype machines
- Getting CF approvals for machines
- Collaboration and technology transfer
- Expanding to meet rising global demand.
- Investing in HRD by taking professional to meet the challenges of International market.

The association Indian Pharma Machinery Manufacturers Association (IPMMA) also arranges various technical seminars to make people aware about new developments. Evidently, the Indian pharma machines which have already made a dent in the domestic soil have also started making considerable forays into the Indian international market as well. The growing acceptance of the Indian machines is in the foreign countries is illustrative of this trend.

2. Pharmaceutical Engineering and Machinery Sector

During the 60's and 70's the pharmaceutical industry mostly imported machines from Europe for their processing and packaging needs. But the mid 70's saw the country going through a severe shortage of foreign exchange and therefore the Indian government introduced very high import duties and restrictive import licensing policies. This forced all the pharmaceutical companies to encourage some Indian engineering enterprises to manufacture machines locally. This was perhaps the only route for the pharmaceutical industry to enhance production and cater to the growing demands of the domestic market. This was a great opportunity for the Indian small scale engineering companies to provide machineries to the pharmaceutical industry and thus a scenario was created whereby 100's of machinery manufacturers grow rapidly to provide the needs of 1000's of pharmaceutical companies over a period of time. Today Indian pharmaceutical manufacturing cost much lower and this was made possible due to the huge savings on capital investment of plant and machinery besides low-cost technical manpower costs. Looking at the capabilities of Indian engineering companies many international machine manufactures have joined hands with some Indian companies which has helped the Indian pharmaceutical industry to procure further improved Indian made machinery at a price almost one third or one fourth of the imported technology. The Indian Pharma Machinery Industry growing 15-20% annually and there are more than 700 units today, that are supplying machines to the pharmaceutical industry in India and worldwide. There is bright future for Indian Pharma Machinery industry. The machines produced by our foreign counterparts are however, five times more expensive than Indian machines, for the same products and in the same capacity. Because Indian pharmaceutical machineries are inexpensive, people still look to the Indian market for those products

3. Pharmaceutical Machineries: Global Market

The pharmaceutical machineries made by India are installed and under operations at all the FDA Approved manufacturing

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facilities in USA, Australia, Africa, etc. meeting the parameters of complete satisfactions. The high credentials goes to strict quality standards adopted by the pharmaceutical machinery manufacturers in India, which had lead some of the Indian companies have entered in to the technical tie-ups / joint ventures with USA, Europe and South East Asian companies to manufacture their products in India and being marketed in all Asian and CIS counties. Emerging markets such as China, Russia, Turkey and Korea had double digit growth, contributing significantly to this large growth rate.

In the next five years, world pharmaceutical market alone is poised grow at a rate of 8 percent with business opportunity of over a US\$ trillion. Countries like USA, Japan and those of Europe led by Germany shall remain dominant market controlling over 80 percent trade opportunities. Asian countries like South Korea, Taiwan and India are expected to have growth rates ranging from 12 to 15 percent annually.

The new product patent regime and increased proportion of Indian pharmaceutical exports to advanced markets is gearing Indian pharma machinery manufacturers to better GMP and higher technological adaptation. Indian machinery companies have started to follow proper documentation and maintenance of records for every manufacturing and maintenance procedure, which is demanded by international buyers. Indian machinery manufacturers are perfectly evolving with changing times. Today, Indian machines are far better in quality and in par with international standards, than it used to be 15 years ago. Indian manufacturers follow the ISO 14000 and 9001 series of quality certification. Due to industry trends such as off-shoring and outsourcing, there are an increasing number of pharmaceutical manufacturers in Asia, and instrument providers are keen to take advantage of this booming market.

North America remains the largest Pharmaceutical market constituting 49% of the worldwide market followed by Europe and Asia-Pacific. Pharmaceutical market across the world is witnessing increased opportunities in the area of Bio Pharmaceuticals, Pharmacogenomics and Biologics market. The smaller national markets in Asia-Pacific and Latin America are expected to grow significantly and will increase their presence in the global Pharmaceutical landscape.

The top big players now are concentrating on the regulated US and European markets, giving their local giants a run for their money. It is common knowledge that USA and Europe take up the lion's share of around 80% of the global pharma market. The model keeps on upgrading the total culture of the industry and encouraging the medium companies to enter the export market. The entry of the top companies in the regulated markets and their success in the generic market has become benchmark for all the small & mid-size companies. The phenomenal growth of these companies & growing profit margins means a bonanza for their stockholders, fueling fresh investment in the Industry.

In terms of pharmaceutical packaging, there is robust growth ahead for this sector. The global pharmaceutical and healthcare packaging market will grow with a compound annual growth rate (CAGR) of 6.2 % in 2009. With

approximately 34 % of the share, North America is still the largest market, followed by Western Europe with 29 % and Asia with 24 %. Eastern Europe's share is relatively low at 4.5 % but expected to increase above average to 5.3 % in 2009. The pharmaceutical packaging technology market is estimated to grow by 4.3 % until 2009.

The U.S. pharmaceutical industry has achieved worldwide prominence through research and development (R&D) work on new drugs, and spends a relatively high proportion of its funds on R&D compared with other industries.

3.1 India: Market Place

Indian pharmaceutical industry is not only one of the fastest growing sectors of Indian economy but also a leading player in the world - ranking 4th in volume and 13th in value terms. With an annual turnover of Rs 1,500 crore and growing at over 10% per annum Indian pharmaceutical machinery manufacturing sector constitutes around 5% of the global market in value terms. The rise in joint ventures between foreign and Indian pharma companies proves that India can make world-class products at affordable prices. There are also significant opportunities for pharmaceutical plant design consultancy and related services especially for large companies adapting to USFDA, UKMCC standards. Overall, being the lowest cost producer combined with FDA approved plants, India promises to be a global outsourcing hub for pharmaceutical products.

Figures on Pharmaceutical Machinery

- Rs 1,500 crores - Estimated market
- 10% - Rate of growth
- 400 - Organized machinery makers
- Rs 200 crores - Export of machines/year
- 5% - Annual import

4. Pharmaceutical Machinery: Technology

The growth in advancement and up-gradation of technology in machinery has been faster in India. With almost low technology offerings in the initial stage, the Indian machinery today is considered as one that can offer value added engineering with integration of new technologies. Various international companies found it cost effective to work with Indian partners in the form collaborative ventures. The number of joint ventures between foreign and Indian machinery manufacturers is a testimony to the fact that the Indian machinery industry understands the stringent need of pharmaceutical industry and that it can produce international quality at affordable prices.

It is significant to note that India and China are making machinery which are 10-20 times less expensive than that of those made in the US and Europe. But German made machines are unbeatable and it is difficult for Indian manufacturers to produce machines that match German quality, and prices are undoubtedly more than that of Indian machinery.

In future, it will not be surprising to find managers of pharmaceutical companies waging an all-out war in the market to gain a competitive leverage, with little or no time to efficiently plan and design their manufacturing processes, which would possibly slash their production costs and increase their bottom line. This is a scenario, wherein the Indian machinery will come handy. Like information technology, the Indian machinery industry is all set to make in-roads in the various markets of the world to lead a manufacturing revolution.

Indian pharmaceutical-machine makers and their Western counterparts increasingly are exploring collaborations and partnerships with each other to innovate or share new technology. Together, they are targeting more price conscious developing countries.

5. Pharmaceutical Machinery: Application

In manufacturing pharmaceutical product various type of machineries are required at each processing stage from production to packaging. Following are the summary of various pharmaceutical machines application.

- 1) Tablet Coating Machine is used for sugar and film coating of tablets, pellets, granules etc.
- 2) Fully Automatic Tablet Counting & Filling Machine is suitable for counting and filling hard gelatin capsules, soft gels, coated tablets, tablets, bean or ball shaped objects, round pills and other solid material.
- 3) Roll Compactor is designed for the densification by compacting powder for the Pharmaceutical and Bulk Drug Industries in particular, Food & Chemical industries in general.
- 4) Comminuting mill is used for wet and dry granulation, pulverization or dispersion of product or ingredients in pharmaceutical, chemical, bulk drug, food & other industries.
- 5) Multi mill is a self-contained portable unit useful for high speed Granulating, Pulverizing, Mixing, Shredding and Chopping of a wide range of wet and dry materials
- 6) The fluid Bed Dryer are most suitable for drying granular crystalline, coarse or similar material in pharmaceuticals, fine chemicals, dyes, food and allied products.
- 7) Tray dryer is used for drying of pigments, food, bakery, electrodes, chemical and plastic powders
- 8) Vibro Sifter is used in various industries such as chemicals, pharmaceuticals, dyestuff and pigments, ceramics, food products, detergents, cosmetics, pesticides, and fertilizers, paper pulp, plastics, resins, paints, polyester chips, minerals, rubber compounds, slurries, metal, powders
- 9) The Octagonal Blender is an efficient and versatile blending machine for mixing and lubrication process of dry granules equally. It can be used for pharmaceutical, food, chemical and cosmetic products etc.
- 10) Mass mixers are special pharmaceutical machinery used for through mixing of wet as well as dry or lump material, especially suited for tablet granulation.
- 11) V-Type Blenders is most suitable for paints, dye-stuffs and pharmaceutical.
- 12) Double Cone Blender is an efficient and versatile machine for mixing dry powder and granulates uniformly.
- 13) Double Sided Tableting Press Machine is used to produce round, double-sided engraved or irregular tablets in a wide variety of shapes.
- 14) Tablet Press Machines can produce all types of round tablets, irregular tablets and tablets of engraved on double sides.
- 15) Punches and dies used for continuous production, longer life of machine parts hence less spares consumption.
- 16) Dust Extraction unit is used to control the flying dust generated during high-speed compression of tablets.
- 17) Capsule fillers are used to fill hard gelatin and non-gelatin capsules with pre-determined quantity of liquids, powders, pellets, tablets.
- 18) Capsule Inspection Machines ensure fast and accurate checking and sorting of all defects in different types of tablets.
- 19) Capsule Counting and Packing Machine is most suitable for counting and packaging of capsules or tablets respectively.
- 20) Powder filling machines are used in Pharmaceutical, Cosmetics, Chemical, and Food & beverage industries. Powder Filling Machines are suitable for sterile, injectable, dry syrup powder filling.
- 21) Ampoule filling machines is used to fill ampoules as well as vials.
- 22) Liquid Filling Machines are specialized machines used to fill bottles, vials, ampoules and other containers with pre-determined quantity of liquids.
- 23) Volumetric Liquid Filling Machines are best suited for filling liquids with low to medium viscosity.
- 24) Vacuum Liquid Filling Machines are best suited for filling liquids that are foamy and caustic in nature.
- 25) Semi-Automatic Volumetric Liquid Filling Machine can be used for different types of glass, Plastic, Metal containers.
- 26) Vial Filling Machines are used to fill vials and bottles with liquids, viscous material and suspensions and powders.
- 27) Labeling Machines are suitable for Labeling on Round Vials, Bottles and other round objects.
- 28) High speed fully automatic Self Adhesive Sticker Labeling system with integrated security system for labelling vials, ampoules and syringes.
- 29) Automatic Wet Glue Bottle Labeling Machine is useful for PVC, PET, Glass Bottles for Liquor / Pharmaceuticals / Beverages / Household Products / Oil Edible & Lube / Chemical Industries.
- 30) Automatic Carton Code Printing Machines can print on plain, Laminated and Varnish Carton as well as on Polythene Bags.
- 31) Label Printing Machine is used to print primary, secondary, top, bottom, wraparound or multi-panel variable product identification labeling.
- 32) Rotary Bottle Washing Machine is used for washing injection bottles, infusion bottles, ampoules, cartridges and syringes.
- 33) ROPP CAP Sealing machine are suitable to apply ROPP cap on round as well as flat, rectangular shaped bottles.

- 34) Ointment Manufacturing Plants are ideal for the pharmaceutical and cosmetic industries for the production of ointment, creams, tooth paste, lotions and other emulsions and homogenizations.
- 35) Planetary Mixer is useful for thorough mixing of ointments, creams, lotions, toothpastes etc. in sterile or non-sterile conditions.
- 36) Fluid Bed Dryer are most suitable for drying granular crystalline, coarse or similar material in pharmaceuticals, fine chemicals, dyes, food and allied products.
- 37) Vacuum Tray Dryer is used mainly for drying of high grade, temperature and oxygen sensitive products.
- 38) Dry Heat Sterilizer has the advantage that it can be used on powders and other heat-stable items that are adversely affected by steam.
- 39) ETO sterilizers are widely used in the pharmaceutical industry and health care institutions to sterilize products sensitive to moisture or heat.
- 40) Sterilizing tunnel is a tunnel like region, responsible for dry heat sterilization and dehydrogenation of containers, vials, bottles, ampoules etc.
- 41) Cleaning in Place or CIP systems are widely used in the pharmaceutical and biotechnology industry to clean and decontaminate tanks, reactors, decanting pumps, and transfer lines etc.
- 42) Sifter is suitable for separation of foreign objects from dry powder before mixing.
- 43) Vibro sifters are used to separate mass composition of solids, liquid from solid and for gradation of materials as per particle sizes.
- 44) Blister Packaging Machines are used for the packing tablets, capsules, pills and other similar products packing.
- 45) Conveyor belt is used to transport or convey particles, raw materials or finished products from one place to another.
- 46) Box strapping machines are widely used to package all kinds and sizes of boxes including corrugated boxes and PP boxes.
- 47) Carton sealing machines packaging machinery are used for sealing of cartons, boxes of various sizes and shapes.
- 48) Shrink wrap machines make use of plastic to effectively seal a container or product by tightly surrounding it.
- 49) Cartoning Systems are suitable for online cartoning of blisters, bottles, vials, vial and ampoule, bottle and dropper, tubes, etc.
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Mohana Krishna Goud V received the B.E degree in Mechanical Engineering from Jawaharlal technological university in 2011. During 2011-2015, he worked as sales & marketing profession in Pharmaceutical Machinery Market in India and Germany, Having