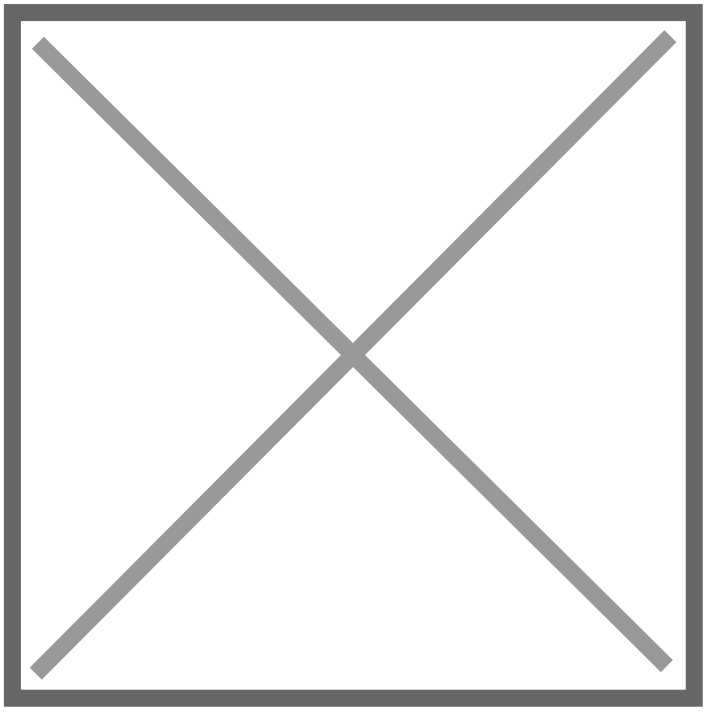
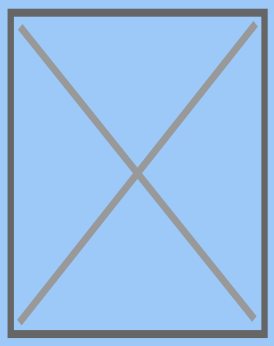
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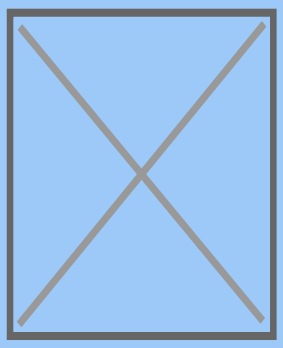
Bridging skill gaps for BT industry

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Bridging skill gaps for BT industry





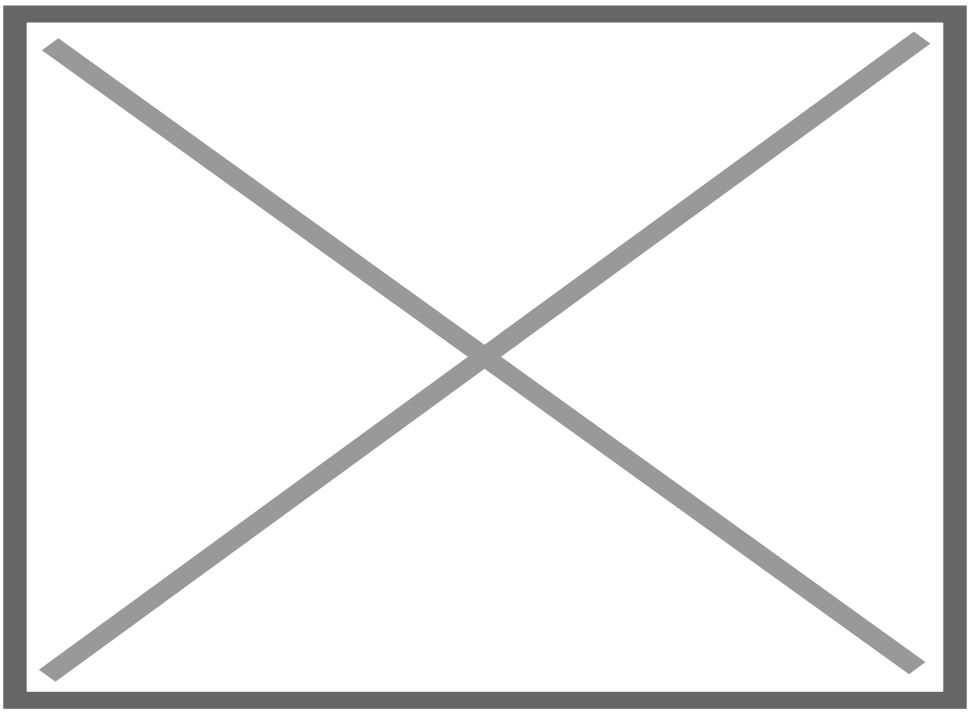
Shubhlata Sharma, Senior Scientific Officer (shubhlata@dbt.nic.in) & Dr Suman Govil, advisor (suman@dbt.nic.in), DBT, Ministry of Science & Technology.

The DBT has taken initiatives to ensure that the biotech industry gets quality manpower.

The Indian biotech industry is expected to reach $5 billion by 2010 from $2 billion in 2006 (Assocham and BioSpectrum) and $25 billion by 2015. The industry and policy makers are ambitious to clock $40 billion by 2015. At present, half of biotech industry's revenue comes from exports and there is scope for expansion of domestic market. India offers competitive edge due to large domestic market, availability of skilled manpower at relatively low cost and strong biomanufacturing skills. Owing to its strengths in computing software and services in data management, India is the preferred hub for clinical data management. The growing pressure on pharma industries to reduce the cost of new products has created new opportunities for contract research, manufacturing and clinical trials in countries such as India and China. Although India's share is less than two percent of the $50 billion global pharma market, it is still the preferred destination for contract manufacturing due to the presence of 800 GMP compliant manufacturing units in the country. At present, the domestic contract research sector is around Rs 480 crore and is expected to grow at 80 percent, according to industry estimates. Indian clinical research organizations (CROs) are currently growing at a rate of 40-50 percent and are shifting their thrust from bioavailability and bioequivalence studies to phase I Ã¢â?¬â?? IV clinical trials and data management. Life science analytical instruments account for 26 percent share of the global market of $31 billion, which is approximately $8 billion. The Indian analytical instrument business is growing at a growth rate of 20 percent and there is tremendous scope for growth provided we match international standards.

For the first time, India grew more Bt cotton (3.8 million hectares) than China (3.5 million hectares) and moved up the world ranking by two places to number five in the world of biotech crops, overtaking both China and Paraguay (Global status of commercialized Biotech/GM Crops: 2006 by Clive James).

Biotech based business being knowledge intensive, there is bound to be a spurt in consultancy organizations, which could provide services such as technology evaluation, transfer and commercialization, business planning, work force training, identifying opportunities for global collaboration, merger or acquisition, working of innovative terms of payment etc. to the existing and aspiring investors and entrepreneurs. The growth in the sector is bound to create requirement for skilled human resource. BioSpectrum in association with ABLE conducted a survey of top 20 biotech industries regarding manpower availability, requirement of manpower as well as quality. The industries from various sectors were selected to understand the mood and sentiments of the industry. The analysis has shown that demand is high and supply is low. Currently, the industry employs 23,000 scientific personnel and the requirement is estimated to be 60,000 in 2009-10.



Prominent indus try leaders and HR experts feel that it is difficult to find the right candidates as the skill sets of manpower produced by academic institutions often do not match the requirements of the ever competitive biotechnology industry. Finding the right people for the job is the immediate challenge faced by the industry, as industry finds it difficult to invest in in-service training of hired candidates.

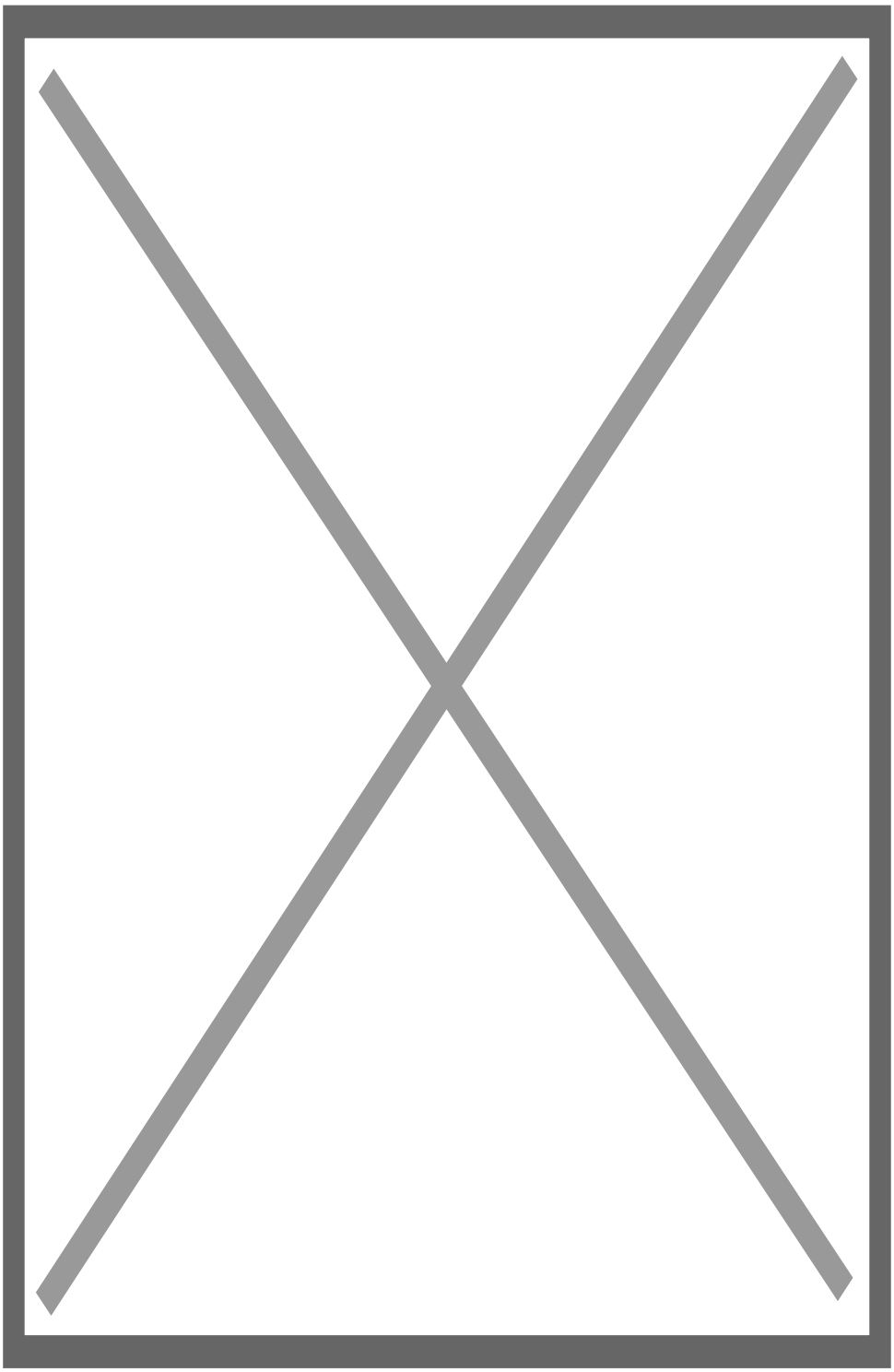
Realizing the need of trained manpower in biotechnology, the Department of Biotechnology (DBT) conceived an integrated approach for human resource development comprising of postgraduate teaching programs, training of faculty and mid-career

scientists in national and overseas laboratories for upgradation of skills, participation in seminars and symposia. Initially, postgraduate teaching programs were started in six universities in 1985-86 and keeping in mind, the demand for trained manpower in specific areas as well as regional aspirations, these programs have been expanded in over 61 universities in general, medical, agricultural, marine, veterinary, industrial, pharmaceutical biotechnology (Figure 1).

On an average, about 800 students are passing out each year (Figure 2).

The programs have been conceived as collaborative, inter-departmental and inter-institutional programs and started on the basis of core strength of faculty, existing infrastructural facilities, R&D grants on competitive funding basis, nearby institutions engaged in biotechnology R&D etc. The catalytic role played by these has inspired many other institutes to initiate such programs on their own. Liberal grants are provided for establishment of specialized laboratory infrastructure, equipment, recurring grants for consumables, studentship, books and journals, travel, visiting faculty and contingency. These programs have not only improved quality of teaching and research in biotechnology but also the allied life science fields.

In order to maintain uniformity and minimum standards of education, model course curricula have been developed and adopted by all with minor institutional variations based on in-house faculty strength. The curricula revision exercise is undertaken periodically to incorporate the latest developments. Faculty upgradation programs with emphasis on practical training have been initiated for faculty involved in undergraduate and postgraduate teaching to keep pace with the rapid advances in the area.



Selection of students is made on all India basis through Common Entrance Test (CET) conducted by Jawaharlal Nehru University (JNU) for 42 universities, joint entrance test conducted by IIT or tests conducted by respective universities. The students coming out of these programs qualify in UGC-CSIR National Entrance Test (NET) for Junior Research Fellowship (JRF), DBT Biotechnology eligibility test (BET) for JRF and are pursuing research in leading laboratories in the country e.g. TIFR, BARC, IISc, NII, CCMB and JNU. A number of students find placement in leading industries such as Biocon, Dr Reddy's Laboratories, Shantha Biotech, Panacea, Advanced Enzyme Technology, Bharat Serum, Intas Pharmaceuti cals, Serum Institute, US Vitamins, Wockhardt, Zydus Cadila Pharmaceuticals.

Employability of M.Tech students in industry is much better as compared to MSc General Biotechnology students, which is evident from Fig. 3 and 4.

Considering the estimated growth in different sectors of biotechnology and taking stock of existing teaching programs, the Department has decided to initiate new programs in food and nutrition, clinical pharmacology and product development, bio-instruments and biomedical standards, bioenterprise management and financing and regulatory affairs.

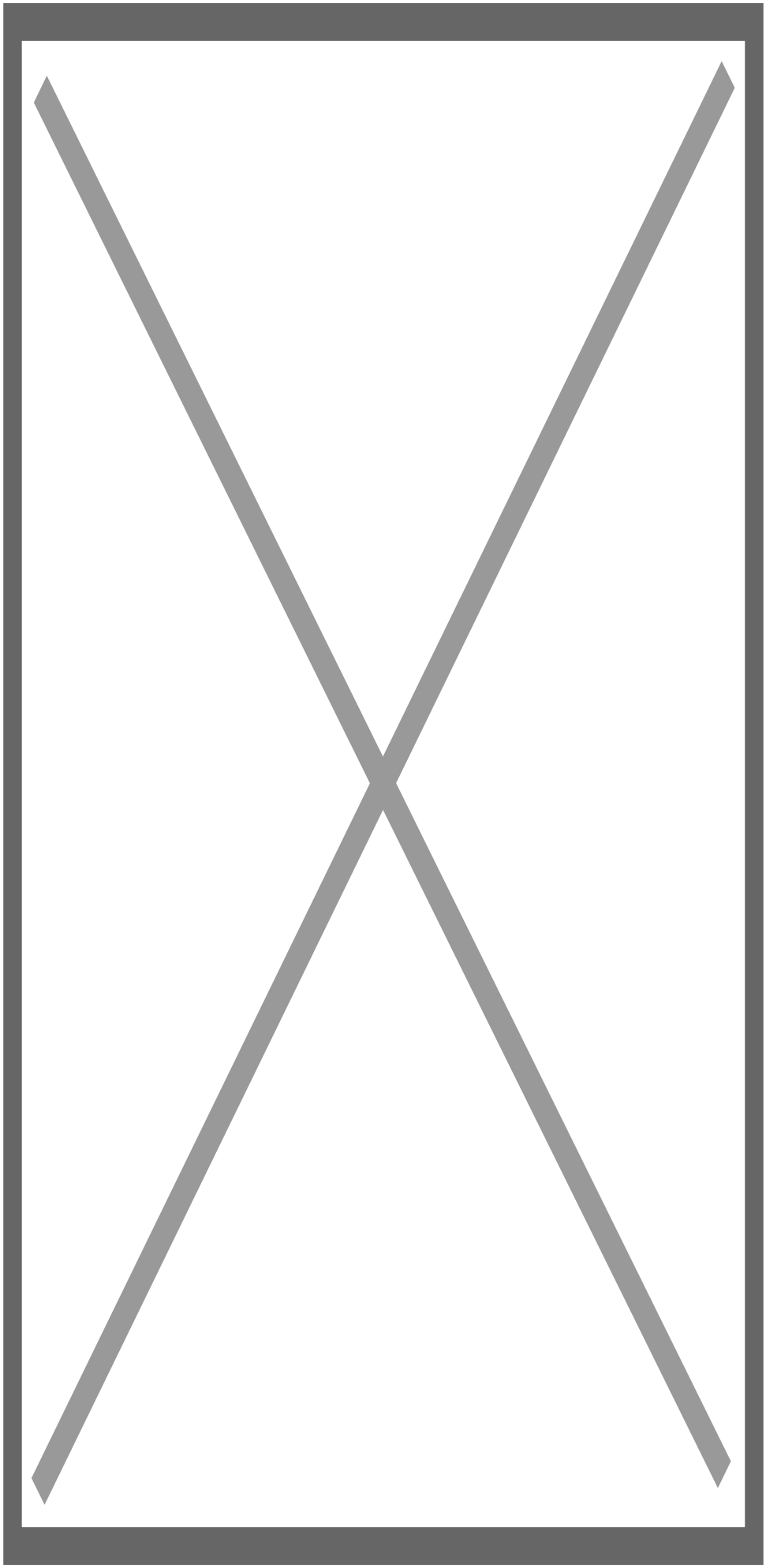
Taking note of industry requirements for candidates with practical skills, the Department started a program way back in 1992 for providing industrial exposure to biotechnology postgraduates for a period of six months in industry. It is intended to bridge the gap between the skill sets of students produced by universities and requirements of industry. This program is mutually beneficial as industrial exposure orients students to needs of industry increasing their acceptability for placement and an opportunity to the companies to assess the performance of trainees. Selection is very stringent and only 20 percent of eligible applicants are finally offered training. This training has become increasingly popular among students and industries as is evident from increase in the number of applicants, selected candidates and industries offering this training (Fig. 5, 6 and 7).

During the last three years, 422 students have availed this training and as expected, MSc General Biotechnology students are the major beneficiaries of this program.

During 2006-07, students have been offered training in R&D, production, marketing and analytical activities, quality assurance and control, regulatory affairs. Specific training has been offered in areas like animal health, transgenic plants, molecular marker assisted breeding, ecofriendly technologies such as biofertilizers, biopesticides, biofuels, micropropagation , vaccines and diagnostics, bioinformatics, purification and synthesis of industrial enzymes and proteins, clinical trials, awareness programs about deadly diseases such as AIDS.

Approximately, 25 percent trained students find permanent placement in industry. Some of the industries which have absorbed trainees are Biocon, Dr Reddy's Laboratories, Shantha Biotech, Panacea, Advanced Enzyme Technology, Bharat Serum, Intas Pharmaceuticals, Serum Institute, US Vitamins, Wockhardt, Zydus Cadila Pharmaceuticals, Lifecare Innovations, Unique Biotech, Century Seeds, Sangene Biotech, Shanta Biotechnics, Dabur, Jubilant Biosys, Gangagen Biotechnologies, Monsanto, Avesthagen, Invitrogen, Ranbaxy, Bangalore Genei, United Breweries and Tata Tea.

This training helps in refining the academic knowledge base of students by complementing with practical skills. It also reduces cost for in-service training and saves time resulting in enhanced quality and productivity. Going by the current and predicted growth rate of biotech industry in various sectors and corresponding e nhanced need for trained manpower, the DBT is considering to substantially increase the number of students to be trained every year in this program.



A list of leading biotechnology companies state-wise where the students have availed training in 2006-07:

Karnataka (24): Bangalore - Avtar Diagnostics, Best Biotek Research Labs, Bhat Biotech, Biovet, Connexios Life Science, EID Parry (India), Gangagen Biotechnologies, Indo American Hybrid Seeds, Jubilant Biosys, Keragen Technologies, Metahelix Life Sciences, Monsanto Research Center, Multiplex Biotech, MWG Biotech, Natural Remedies, Rishi Herbal Technologies, Sigma Aldrich Chemicals, Sri Raghavendra Biotechnologies, Vittal Mallaya Scientific Research Foundation, Xpression Biotek, Indfrag, VB Medicare, Labland Biotech (Mysore), Labland Neobiotics.

Andhra Pradesh (16): Hyderabad - AG Bioteck Laboratories (India), Bharat Biotech International, Biological E, Bioseed Research, Dr Reddy's Laboratories, Excel Matrix Biological, JK Agri Genetics, KN Biosciences, Shantha Biotechnics, Sreeven Pharma, Sri Biotech, Vimta Labs, Virchow Biotech, Zenotech Laboratories, Prathista Industries, Hi-Tech Pharmaceuticals.

Maharashtra (10): Pune - Ajay Bio-Tech (India), Gennova Biopharmaceuticals, Indo Bioactive Labs, Jalna -Bejo Sheetal Seeds, Maharashtra Hybrid Seeds Co., Mumbai - Nicholas Piramal India Ltd, Roche Diagnostics, SRL Ranbaxy, Aurangabad - Nath BioGene, Nagpur - Maharashtra State Seeds Corporation.

Delhi (7): Auroprobe Laboratories, J Mitra Co., LakshmiKumaran & Sridharan, NACO- National AIDS Control, Panacea Biotech, TechnoConcept (India), The Energy and Resources Institute.

Tamil Nadu (5): Chennai - ABL Biotechnologies, Kevincare, Malladi Drugs & Pharmaceuticals, Orchid Chemicals & Pharmaceuticals, Shasun Chemicals and Drugs.

Orissa (4): Bhubaneswar - Imgenex India, Kalinga Plant Resource Centre, Tectona Biotech Resource Centre, Utkal Biotech.

Haryana (3): Gurgaon - Lifecare Innovations, Ranbaxy Research Laboratories, Thar Biotech.

Uttar Pradesh (3): Ghaziabad - Biomed, Dabur Research Foundation, Noida - Jubilant Clinsys.

Gujarat (2): Ahmedabad - Intas Biopharmaceuticals, Surat - Span Diagnostics.

West Bengal (2): Siliguri - Peak Chemical Industries, Kolkata -East India Pharmaceutical Works.

Pondicherry (1): Romvijay Biotech