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Biotech education and career avenues

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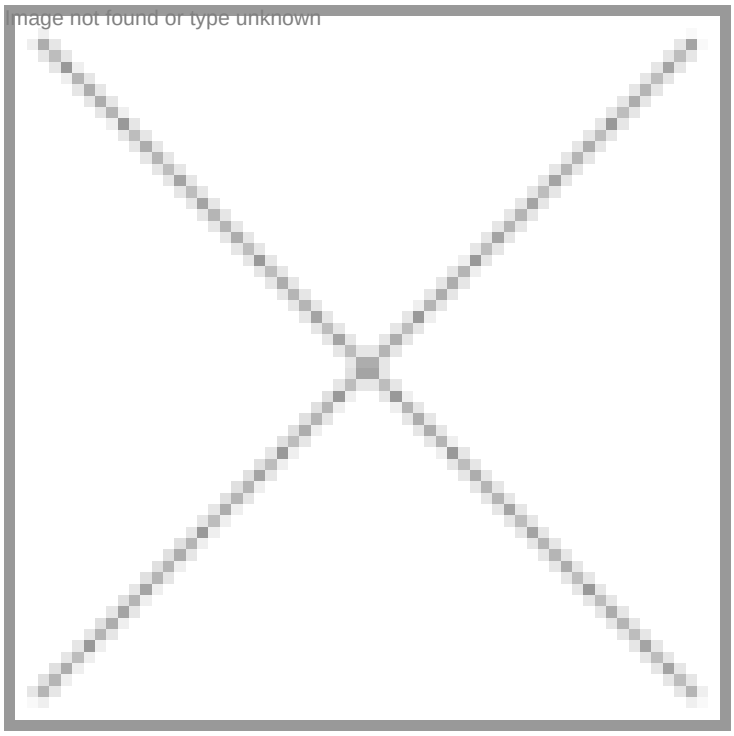

Biotech education and career avenues

Dr Suman Govil and Shubhlata Sharma elaborate on the DBT's efforts in generating skilled manpower in the biotech arena along with the job openings and scope that the segment offers.

The Government of India started a multi-agency National Biotechnology Board comprising the UGC, ICMR, CSIR and DST in 1982, which was upgraded to a full-fledged department in 1986 to give the much-desired impetus to this area. India can take pride in being one of the first few countries in the world to initiate an integrated program of human resource development in biotechnology comprising post graduate teaching programs, short-term training courses for upgrading skills of mid-career scientists, faculty involved in undergraduate and post graduate teaching, training in leading overseas laboratories, in gap areas where expertise does not exist in the country.

The department took a well-informed decision not to start undergraduate teaching in biotechnology, as it is a highly specialized, laboratory-intensive course. The post graduate courses were initiated in 1985 in six universities in close collaboration with the University Grants Commission, ICAR and the Department of Ocean Development. These programs were conceived as collaborative, inter-departmental and inter-institutional programs and initiated on the basis of core strength in the area of faculty, existing infrastructural facilities, R&D grants on competitive funding basis and nearby institutions engaged in biotechnology R&D. India is a vast country and keeping in mind, the demand for trained manpower in specific areas and regional aspirations, these programs have been expanded in over 61 universities in general, medical, agricultural, marine, veterinary, industrial and pharmaceutical biotechnology. The department is considering initiating new programs in

food and nutrition, clinical pharmacology and product development, bio-instruments and biomedical standards, bioenterprise management and financing and regulatory affairs.

Curricula: To maintain uniformity and minimum standards of education, model course curricula have been developed by organizing brainstorming sessions. To keep abreast with the latest developments in the rapidly advancing area of biotechnology, faculty up gradation programs in leading national laboratories with emphasis on hands-on training have been developed for college teachers involved in undergraduate education and faculty associated with postgraduate teaching. There is a provision for training in overseas laboratories also.

These teaching programs are continuously monitored by an in-house advisory committee with outside expert members from academia and industry and DBT representative, annual meeting of course coordinators and DBTâ€“UGC joint task force on HRD to ensure minimum and uniform teaching standards.

Admission procedure: To compete in the global market for jobs, it is important to select bright and meritorious candidates and impart best training. The selection of students is made on an all India basis through Common Entrance Test (CET), joint entrance test conducted by IIT or tests conducted by respective universities. The courses are very popular and admission procedure is highly stringent which is evident from the fact that approximately 21,000 students competed for 428 seats of MSc General Biotechnology in the JNU Common Entrance Test during 2006-07.

Placement analysis: The success of a teaching program is primarily judged by the quality of education imparted and placement of students passing out. These programs have flourished as 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 like the 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 Pharmaceuticals, Serum Institute, US Vitamins, Wockhardt and Zydus Cadila Pharmaceuticals. The analysis of the first placement of approximately 1000 students produced during 1985 -1995 shows 54 percent students opt for PhD within the country, almost ¼th students opt for jobs in research, teaching and industry. The analysis of 2000 students produced during the last five years depicts almost similar trend. However, percentage of students working in industry has increased from 12 to 17. As expected, MSc general, agricultural, medical, marine biotechnology students prefer PhD while MTech students (almost half) join industries.

Industrial training: Prominent industry 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. This could be due to a big gap between the knowledge imparted vis a vis knowledge required by the industry. Finding the right people for the job is the immediate challenge faced by the industry, as the industry finds it difficult to invest in in-service training of hired candidates.

To bridge this gap, the Department of Biotechnology is facilitating practical exposure to biotechnology postgraduates for a period of six months in the industry. This program is mutually beneficial to the students and industry. Industrial exposure orients students to the needs of the industry increasing their acceptability and also provides an opportunity to the companies to assess their performance. This program has completed 15 years and has become increasingly popular among students and industries as is evident from increase in number of applicants and number of selected candidates. The number of industries offering this training has also steadily grown. Several leading biotechnology companies like Monsanto, Workhardt, Aurigene Discovery Technologies, Gangagen Biotech, Lifecare Innovations, Dabur, Dr Reddy's Lab, Panacea Biotech, JK Agrigenetics, Auroprobe Labs, Nicholas Piramal, Jubilant Biosys, Pepsi Foods, Pepsico Holdings, ABL Biotech Ltd and Mahyco have offered training to the students. This industrial training has facilitated in permanent placement of students in the industry with a success rate of approximately 25 percent. Some of the industries who have absorbed trainees are Lifecare Innovations, Unique Biotech Ltd, Century Seeds, Sangene Biotech and Shantha Biotechnics, Dabur, Jubilant Biosys, Gangagen Biotechnologies and Monsanto.

Career opportunities: Biotechnology has applications in all spheres of human and animal life such as food and nutritional sufficiency, health, crime investigation and forensic science, environmentally sustainable development. Predictions of IT-BT led boom in the coming years resulted in hype with hope for creation of a number of jobs in the coming years. This has led to mushrooming of a large number of private and public sector institutions conducting self-financing degree courses in biotechnology both at undergraduate and postgraduate levels. This expansion has led to a general deterioration in quality of manpower, which is a major concern with producers, as well as employers of manpower. The need for accreditation of institutes offering teaching programs has never been felt so strongly before.

Opportunities for biotechnology students exist in agri-based industries involved in production of transgenic plants, seed industries, tissue culture units, agri chemicals such as biofertilisers and biopesticides, environmental amelioration, pharma

industries for diagnostics, vaccines, new drug molecules, clinical research organizations and bioinformatics industry. Opportunities exist in research and development, production and manufacturing, quality control and analysis, technology transfer and management knowledge-based marketing, setting up of new enterprises, consultancy organizations for preparation of techno economic feasibility reports, regulatory affairs such as toxicology, environment health and safety, biosafety, patent attorneys and examiners for IPR. The jobs for marketing are 20 times more in number as compared to R&D as well as more monetarily rewarding. With India becoming a signatory to GATT, a sudden spurt in filing of patents as well as dispute settlement cases has been witnessed resulting in the creation of tremendous opportunities for patent attorneys and examiners. In addition to the industry, opportunities for science management, teaching and R&D jobs exist in public and private sector teaching and R&D institutions.

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Note: The views expressed in this article are those of the authors and not necessarily of the organization to which they belong.

Note: This is a summary of the comprehensive article published in the January 2007 issue of BioSpectrum. The complete list of DBT programs is available online.