

## Microbiology and Biotechnology Education in India

This might seem an unusual topic to write an editorial on, but this is an issue that has been bothering me for several years and urges to be highlighted. This idea prompted me when I recently had the opportunity to interact with post-graduate students of Biotechnology and Microbiology while conducting an interview. It disappointed me to come across the poor performance of majority of the students. They lacked the fundamental knowledge of the subject! Is it not disturbing to find a student with a master's degree been unable to distinguish a gram negative bacterium from a gram positive one? Many were speechless when asked about commercialized recombinant products in the market. This is indeed a thorny issue that needs attention as student performance is declining relatively at an alarming pace.

Needless to say, microbiology is playing a significant role in today's news enveloping hot topics like gene therapy, vaccines and synthetic genomics. The advancement in the field of science and technology has further widened the scope of research in microbiology. But, research beneficial to the mankind banks upon an excellent teacher-student-industry pipeline that can keep pace with the rapidly advancing field. This issue further sparks a new debate that who needs to be held responsible for the poor student performance? This brings us to seriously ponder upon the current status of teaching in microbiology. Merely producing graduates and post graduates in large bunches that are not absorbed by the industry is nothing but the divergence of huge investments towards wastage. This exposes the truth which most of us know, but find difficult to acknowledge – we do not have enough well trained Microbiologists/ Molecular Biologists who are qualified to impart better education to young, bright and enthusiastic students.

Serious attention needs to be paid by authorities to offer meaningful education in microbiology and biotechnology that can fulfil the needs of industry and also the aspirations of millions of students. The major concern facing the biotech academia is the suitability of current biotechnology education and its utility to the industry. While a few education heads opine that the courses are job-oriented to some extent, there are far too many graduates and postgraduates

with training so inadequate that they cannot even bag a job. There are bundles of cases wherein the courses do not have the scope to train the students enough – not even in imparting the basic laboratory practices. The hype that surrounds this industry has led to a dilution in quality of education and has increased the industry's dependence on Ph.D. candidates. It has led to the wastage of a tremendous amount of time and resources in training postgraduates.

Another serious shortcoming in the existing system of microbiology/biotechnology education in India is the lack of exposure of students to laboratory bio-techniques. This is due to limited laboratory sessions during the course, non-availability of the necessary, albeit expensive, instruments and reagents in institutions offering this course, and lack of teachers' expertise in the field as mentioned above.

Additionally, the current syllabi of microbiology and biotechnology is inadequate in today's context with regard to subject knowledge and its ever-increasing applications. Besides, the academic curricula to a large extent do not consider ground realities. They do not leave scope for highlighting the issues that are currently in demand. Now-a-days, projects, practicals and on-the-job training are not feasible with the large intake of students that the educational institutions admit each year. This perplexing state of affairs has led to an anomaly where students are compelled to run around seeking placements, and on many occasions spend money on host of courses offered by institutions. The end result is one where most of the students do not find suitable employment opportunities, and institutions are reluctant to impart training at their own expense.

On one hand the industry is fighting its own battle while on the other, education as such has emerged as a very attractive business, even as it is offered now. There does not seem to be enough incentive for academia and the industry to meet international standards. So, to the thousands of graduates and post-graduates in biotechnology and microbiology walking out of college each year, a dream career in the biotechnology industry may continue to remain a dream. In this context our regulatory bodies and education departments have yet another very important role to play. While there is a need to offer post graduate courses in

microbiology, biotechnology and bioinformatics it must be ensured that such institutes have good faculty and adequate infrastructure else thousands of students will continue being misguided till the time they are out in the rat race.

Thus, the education system has reached a point where industry – academia collaboration is no longer just a desirable thing, but an absolute imperative. And it is the government that can play a key role in creating an environment for this team work. An industry – academia partnership

can indeed bring a revolution in India propelling education ahead. While focussed academics can enhance student performance, the association of industry will play a significant role by working closely with academic bodies to develop a curriculum that meets their needs. This would help the disciplines of microbiology and biotechnology to grow!

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