

## In this issue

### Technical Education

*in the age of technological revolution*

The All India Council for Technical Education in India governs education in engineering, technology, architecture, town planning, management, pharmacy and applied arts and crafts. Conceived by a 1945 resolution, AICTE became a statutory body in 1987 with an Act of Parliament. In the decades after the Act, a social, economic and technological revolution has taken place in India. To meet the challenges of the ever-changing present, private technical colleges mushroomed; and universities under the governance structure of the University Grants Commission, also started offering technical courses. There was a need to review the role and powers of the AICTE. And in 2014, a Review Committee was set up. The Committee's report, submitted in April 2015 is available on the Net.

Quite often, the recommendations of such high profile committees remain on paper (and on PDF files). For example, the U. R. Rao Committee, set up precisely for the same reason, had submitted a report in 2003, but, even after a decade, there was no action taken on its recommendations. So it is possible that the report of the present review may also meet with the same fate – unless the issue is kept alive in the minds of the Indians.

A General Article on **page 159** of this issue looks into the ills that plague technical education in Engineering and Technology. The author, from IIT Mumbai, addresses a vari-

ety of issues, from the process of entrance tests to curriculum to placements.

### Investing in intellectual property

*Surveying India's start-ups*

An article in this issue surveys 50 biomedical start-ups in India to examine the backgrounds of the founders, their employees, location, the area of work of the company, its IP and licensing, incubation experience, funding, expenditure, clients, risks and challenges. All these companies are less than 5 years old. So we get to see the emergence of entrepreneurs who are actively seeking and using IP in biomedical applications.

India has already made its mark in pharmaceuticals. And it has become a favourite destination for medical tourism. This relatively new phenomenon, where biomedical applications based on intellectual property are being actively pursued by young entrepreneurs, may push Indian supremacy in the area of health to a new height. Read for more on **page 167**.

### Sinking Zinc Levels in Soils

*Microbes to the rescue*

A large number of enzymes in our body depend on zinc for their activity. We get this essential micronutrient directly from plants or indirectly from the meat of secondary producers. And plants get zinc from the soil. But then, about 50% of Indian soil is deficient in bio-available forms of zinc. Even if zinc is added to soil as a fertilizer, it reacts with

other soil constituents and soon becomes unavailable to plants. Stunted growth of shoot and leaves, yellowing and browning of leaves and low productivity are the results. In fact, availability of zinc in a form accessible to plants can increase productivity to even 600% in some cases.

The roots of some plants are able to solubilize zinc and utilize it. But not all agricultural crops can do this efficiently. And this is where microorganisms can help. Organic acids secreted by microbes can solubilize zinc and make the micro-nutrient available to plants and, ultimately, to us.

Scientists in Coimbatore started hunting for such microbes in the agricultural fields. The samples collected from the fields of eight different agricultural crops were cultured in media containing insoluble zinc. If they grow well, it is evident that the bacteria in the culture plate can solubilize zinc. And they found 35 bacterial isolates that are successful. The 5 best zinc solubilizers were selected for identification.

It is not easy to determine the microbial species, using a microscope. But the accessibility to the database of 16S RNA libraries of microbes allows comparisons with known species. The technique, though time consuming, has proved to be reliable. Thus scientists were able to identify the potential bio-inoculants to overcome zinc deficiency in plants. And the winner amongst the best five is... Turn to **page 196** for the results.

K. P. Madhu  
*kp.madhu2000@gmail.com*