

for similar brand names designated for different drugs, since the Drugs Controller General, India (DCGI) has not yet taken the initiative to setup a central authority to monitor registration of trade names. For the moment though, pharmaceutical companies should be 'crucified' only if the same brand name is given to two or more drugs. Moreover, we should, in addition, partly blame the medical practitioners for pharmacy dispensing errors.

According to Section 1.5 of the 'Code of Medical Ethics', in the Indian Medical Council (Professional Conduct, Etiquette and Ethics) Regulations³, every physician should, as far as possible, prescribe drugs with generic names and not trade or

brand names. In our country, it is a known fact that most medical practitioners prescribe drugs using trade names. If medical practitioners adhere to the 'Code of Medical Ethics' laid down by the Indian Medical Council, in prescribing drugs with generic names, as far as possible, pharmacy medication dispensing errors can be reduced, as well as the resulting morbidity.

1. Sreedhar, D., Subramanian, G. and Udupa, N., *Curr. Sci.*, 2006, **91**, 147-148.
2. Dooley, M. and Van de Vreede, M., *Lancet*, 2006, **368**, 1419-1420.
3. Indian Medical Council (Professional Conduct, Etiquette and Ethics) Regulations, The Gazette of India, 6 April 2002.

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Making our science education trendier

Way back in the early nineties, the joint Board of Control (BOC) meetings at Panjab University (PU) debated ways and means to make our Honours School system more meaningful, modern and exciting. Discussion was finally shelved due to many reasons, social as well as political, within PU as well as in the region.

Are we willing once again to think afresh, experiment and innovate? Here are some points which have been accumulating in my mind ever since I came on a sabbatical and interacted with a wide cross-section of teachers, students, administrators of all nationalities in the University of Cincinnati (UC), USA. My final urge to pen down the points came when I was hooked onto the UC Electronic Blackboard as a visiting faculty by a Geology Professor, who not only allowed me to observe him teach but used my inputs on the spot in a system which is flexible and vibrant. Some ideas for all friends back home for a wider debate:

- Scrap the attendance registers but have compulsory surprise tests instead of previously declared scheduled house tests;

- Introduce electronic blackboards with all courses, question banks available online to all students;

- Have a number of electronic lecture halls in the auditoria between various departments; install faster internet facility to make teaching effectively internet and research-backed;

- Log use hours of all projection facilities on line to be visible to anyone; this will encourage better active use of these facilities. If these are not being actively put to use by individual departments, they may be forced to share with less fortunate ones not having such facilities;

- Make it mandatory for every teacher and researcher to put his web-page on the university/college website his most prized publications, achievements, courses offered, guest talks, etc. hyperlinked. He can also put up a list of his favourite academic websites that he would like his students to get hooked to;

- Put useful websites in each subject, hyperlinked online, to be available to any student who wants to further use internet for higher academic standards;

- Students be encouraged to create academic quiz and objective question data-bank on individual department websites;

- All outdoor teaching through field study tours in applied sciences be on weekends to nearby areas, so that no teaching hours are lost during such tours. Collections made during such tours to be properly catalogued and put to use in teaching as it would yield a higher personal involvement and excitement. Quiz exams for outdoor examination of students during these tours be designed jointly by teachers and students;

- All vehicles meant for study tours be logged online and their use or disuse be

known to all in the university. This would ensure that this facility is not denied by the haves to the have-nots in the name of departmental autonomy. Use it or share/lose it should be the guiding principle for all facilities, be they instruments or vehicles or lecture halls.

The Physics and Geology departments in UC are in the same building and have costly electronic lecture halls, computer labs, auditoria which are in constant use for teaching, seminars, internet-based practicals using Google earth and multimedia facilities for teaching. Every five years most of our departments get millions of rupees as grants. It is high time we look around the world for multimedia teaching aids for effective upgradation of standards of teaching. Distant and adult learning programmes are normally promoted in our country only for namesake. In UC, these programmes are effectively integrated with normal courses by active faculty, who do teaching and research like all others. In our system, we deny the pleasure of such wholesome occupation to our online teachers as well as students.

We have the first citizen of our country, A. P. J. Abdul Kalam setting a good example in the use of online teaching and use of multimedia projections. It is high time his passion and style spread across all educational institutions. My US colleagues admit that India is way ahead of

USA in academic quality and the eminence of its President and Prime Minister. We need to only slightly change our mindset and reorganize what we have to start our journey to be at par with US universities. It is a pity that our Education Ministry and academic leaders have not been able to rid our schools and colleges of the CET/PMT tuition mania, which is nothing short of a social and academic scourge leading to massive social exploitation of students and parents, putting undue emphasis on all chasing an engineering or a medical college admission at any cost, including buying leaked question papers at whopping prices! A simpler option to restore the credibility or accept the system of CBSE/ICSE as such, does not seem to occur to anyone. Modernization of our exams can rid us of our UMC (Unfair Means Case) forever. It is not just a student who copies but an obsolete examination system which allows it. Make science examination more

scientific. Above all, why not make science learning lucrative? Which technology can grow without science and where can science be taught without practicals but through mere tuitions? Indian science is being killed in intermediate schools and colleges by this rat race for technology at the cost of science. Seeds of science indeed can be sown only in the young minds through a balanced and psychologically wise solution to our highly polarized or distorted science teaching as well as learning.

Most of the elite universities in India have the same type of assets or liabilities of resources, and manpower as well as solutions are indeed common. A slight change of mindsets and management strategies can improve our educational institutions. A study/sabbatical leave and academic stay outside our own, in India or abroad, does a lot to kindle newer ideas and fresh perspectives. Such journeys can do a lot to homogenize the

educational intellect and open up new vistas of a trendy education system capable of becoming an industry in itself. We need to focus much more on our alumni across the world that are ever willing to give ideas as well as support. The alumni page on the website of a university can kindle the minds of our young students as well as faculty. We are indeed rich in such unharnessed assets to augment our academic system. Indian science can have a much brighter future with small grassroots modifications, which are indeed the need of the hour across the country.

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Bioherbicides: An eco-friendly approach to weed management

In irrigated agriculture, weed control through chemical herbicides, creates spray drift hazards and adversely affects the environment. Besides, pesticide residues (herbicides) in food commodities, directly or indirectly affect human health. These lead to the search for an alternate method of weed management, which is eco-friendly. In this regard the biological approach (a deliberate use of natural enemies to suppress the growth or reduce the population of the weed species) is gaining momentum. This approach involves two strategies: the classical or inoculative strategy, and the inundative or bioherbicide strategy. In the inoculative approach, an exotic biocontrol agent is introduced in an infested area. This method is slow and is dependent on favourable ecological conditions, which limits its success in intensive agriculture. Whereas in the inundative approach, bioherbicides are employed to control indigenous weed species with native pathogen, applying them in massive doses in the area infested with target weed flora. Bioherbicides offer many advantages. They include a high degree of specificity of target weed; no effect on non-target and beneficial

plants or man; absence of weed resistance development, and absence of residue build-up in the environment.

Commercial bioherbicides first appeared in the market in USA in early 1980s with the release of the products Devine¹, Collego² and Biomal³. Success stories of these products and the expectation of obtaining perfect analogues of chemical herbicides have opened a new vista for weed management.

Plant pathologists and weed scientists have identified over 100 microorganisms that are candidates for development as commercial bioherbicides. Some of these are described here.

Devine, developed by Abbott Laboratories, USA, the first mycoherbicide derived from fungi (*Phytophthora palmivora* Butl.), is a facultative parasite that produces lethal root and collar rot of its host plant *Morrenia odorata* (stangler wine) and persists in soil saprophytically for extended periods of residual control. It was the first product to be fully registered as a mycoherbicide. It infects and kills stangler wine (control 95 to 100%), a problematic weed in citrus plantation of Florida.

Commercially Collego, a formulation of endemic anthracnose fungus *Collectotrichum gleosporioides* f. sp. *Aeschynemone* (cga) was developed to control northern joint vetch (*Aeschynemone virginica*) in rice and soybean field. Dry powder formulation containing 15% spores (conidia) of cga as an active ingredient was registered in 1982 under the trade name Collego, having a shelf-life of 18 months. It is the first commercially available mycoherbicide for use in annual weed in annual crops with more than 90% control efficiency.

The successful development of Collego led to the discovery of another *Collectotrichum*-based mycoherbicide, 'Biomal' by Philom Bios Inc., Canada. It contains spores of *C. gleosporioides* (Penz.) Sacc. f. sp. *Malavae*. It is used to control *Malva pusilla* (round-leaved mallow) in Canada and USA. The most effective period of application is at an early stage, although it can be effective at any stage of weed growth. Further, the rust fungus *Puccinia canalicuta* (Schw) legrah is commercialized under the name Dr. Biosedge for control of *Cyprus esculantus* L. (yellow nut sedge).