

How safe are Indian laboratories?

Many students opt for science after their 10th standard examination and many of them study chemistry later. In case they fail to get into a professional course, they end up graduating in chemistry and even continue for their Masters and Doctoral degrees. How safe are the laboratories provided by the schools, colleges, Universities and research organizations (government and private) in India? One should not be surprised if the laboratories are located in dilapidated buildings, with paints peeling off and growth of fungi on the walls. A peep into many chemical laboratories would reveal any or all of the following:

Mandatory items like safety goggles, gloves and laboratory coats would normally be absent. In case these are present the experimenter, students and even the demonstrators themselves do not use them.

Auto pipettes and other safe devices for handling the chemicals are absent. (Do not be amazed if the experimenter is seen to suck harmful chemicals through pipettes!) No proper labelling of the chemicals, cautionary notes and warnings and a list of dos and don'ts can be seen in the laboratories. This is vital especially if the experimenter has a history of respiratory or other ailments. Gas cylinders may not be secured and at times could also be leaking.

Ventilation system is bad. Exhaust and ceiling fans are non-working or non-existent. Compounded to this would be scarcity of or non-functional fume hoods. Even if present, experi-

ments would be performed outside them. Lack of first aid boxes, which if present would be found locked up and the key missing, have the essential items misplaced or the medicines would have crossed the expiry date. Improper storage, handling, transferring and transporting the chemical bottles and glass wares are common sights. No proper method of waste handling and disposal exists. Absence of emergency exits, sirens and smoke and fire detectors and extinguishers is more of a rule than exception. (It is not surprising to see experimenters smoking in the laboratories.) One can also observe leaking taps, plumbing problems and precariously located and over-hanging electrical wires.

The above is an open-ended list that could be suitably modified for a biology, biochemical, microbiology, physics or any other laboratory. Some of the laboratories could be time bombs ticking away slowly but surely. What needs to be done to make the work environment safer and user-friendly? The ensuing are a few suggestions. Probably these are adopted in some laboratories but they may be the exception rather than the rule.

Wherever and whenever possible, the laboratories should be designed keeping in mind the safety factors. Of course, budgetary constraints could be a hurdle but some ways (sponsorship?) should be evolved to overcome this problem. Furthermore, there should be scope for future modifications of the laboratories.

The creation of a laboratory safety group, consisting of 2–4 members, is important. The group would be responsible for regularly checking and updating the laboratory, training the users, documenting and putting up prominent cautionary notices. This group would need to have a checklist that pertains to the safety norms, have undergone first aid courses and be vested with powers for a ready redressal. The group should be ready to innovate and take quick remedial measures whenever required.

Since constant exposures to chemicals and other hazardous materials could have an adverse effect in the long run, there is an urgent need to look into and rectify the prevailing laboratory set-up in India. The well being of an experimenter could be at stake because of want of the minimum facility in the laboratory. It is not my intention to paint a bleak picture of the existing scenario but to bring to the fore the importance of safety in the laboratories. Although regulations pertaining to health and safety exist, how far these are implemented, in words, spirit and action, is anybody's guess. Ironically we 'celebrate' a safety week but what about the remaining 358 days?

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Vivid signatures of water on Mars surface strengthen the debate of microbial life

I read with interest the recent exchange of correspondence between Fred Hoyle and Chandra Wickramasinghe (*Curr. Sci.*, 2000, **78**, 1057–1059) and Manoj Komath (*Curr. Sci.*, 2000, **79**, 266–269). The correspondence made a reference in passing to microbial life on extra-solar planets and on Mars, in our solar system. At present, we are not in a

position to say anything with certainty about life on other planets in the solar system as argued by Hoyle and Wickramasinghe. However, it may be noted that there exists a belt around our Sun where life could flourish. Earth is in the middle of this belt. Venus is closer and Mars is farther from the Sun but both the planets lie within this life-supporting

terrestrial belt. The extended exploration by Pioneer Venus Orbiter (PVO) continuously for over twelve years has ruled out any possibility for existence of life on Venus. Mars is not yet extensively studied and therefore possibility of some form of life is not yet ruled out.

The scientific community is aware of the fast developments in space explora-