

## KVPY and NSTS

This is in reference to the commentary 'A decade of KVPY – a challenging experience'<sup>1</sup>. It is stated that National Science Talent Search (NSTS) that was initiated by the National Council of Education, Research and Training (NCERT) was a scholarship programme in which the financial support started from class XI onwards. There is a small factual error. Actually, the NSTS scholarship was awarded to the students pursuing degree course in pure science after they had passed their class XI level, the highest level at school at that point of time (1960s till mid-70s). Students had to appear for a competitive test, as has been rightly mentioned, at the end of class XI and before appearing for the final school leaving examination. It is also mentioned that the students had to pursue pure science to be eligible for the scholarship. So this indicates that the scholarship started only when a student had taken admission in a pure science degree course. The number of NSTS scholarships was not very small compared to the present number of KVPY scholarships. About 350 students used to get selected for the scholarships, some of whom of course did not use it to pursue pure science. Moreover, the IITs in the sixties or seventies, I hope many will agree, were not considered to be the most preferred destinations for studying pure science. There were great undergraduate (UG) colleges

in different parts of the country imparting excellent training in pure science and one will still find a significant number of scientists, researchers and teachers in different institutes and universities who hail from these colleges. There was no research-oriented training but the foundation for pursuing higher studies in science was laid strong. The emergence of IISERs is a phenomenon, concerned people feel, and a welcome happening but that has possibly downgraded the good old UG colleges further. There were no nurturing and mentoring programmes for the NSTS scholars as it is in place for the KVPY scholars now. This is indeed a significant change. However, there were summer schools for the NSTS scholars basically meant for giving exposition in some areas of physics, though these were not at research level.

The authors analysed the performance of the students belonging to different school boards. However, I would like to point out a few things in this regard. The geographical location of virtually all the schools affiliated to a particular state board is within the state itself, with the exception of CBSE and ICSE, as these are not associated with any state. So the performance of the students from those two boards is really not indicative of any geographical region. These schools quite often get students from families with a good economic background. This

aspect possibly we need to take into account. With no intention of undermining the talent and capabilities of the KVPY awardees, a cursory look at the list of such students suggests that a large section of them had their training, may be orientation in some coaching class or other. A large number of these students actually take their board examination from some schools having association with the coaching class and are affiliated mostly to Central Board of Secondary Education (CBSE) or Council for the Indian School Certificate Examination (CISCE). This in a way boosts the performance of these boards. While appreciating the idea of not publicizing the questions of the KVPY, it is difficult to totally rule out the role of the coaching classes in the performance of the students in KVPY. After all, in India for any competitive examination of any level coaching classes do exist and KVPY appears to be no exception.

1. Anil Kumar, P. S. and Chatterji, D., *Curr. Sci.*, 2009, **97**, 1282–1286.

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## Reserpine and Indian traditional medicine

Jain and Murthy<sup>1</sup>, in their historical account on reserpine and its role in neuropharmacology, have confused readers regarding the discovery of reserpine, giving an impression that it was achieved in India, but developed abroad. I wish to give a brief factual account of the discovery.

Siddiqui and Siddiqui had isolated a number of crystalline alkaloids in the years 1931–35 from the root of *Rauwolfia serpentina* Benth. (Sarpagandha), as stated by Jain and Murthy<sup>1</sup>. None of these compounds could explain the use of Sarpagandha root powder in Indian traditional medicine to treat mental illness. Indian workers have observed in

1947 that 'alkaloid-free' oleo-resin fraction produced sedative and hypnotic effects in animals<sup>2</sup>. Vakil<sup>3</sup> published in 1949, the results of his clinical trial of *R. serpentina* in essential hypertension.

Concurrent with the medicinal interest in *R. serpentina*, Swiss chemists at Ciba Pharmaceutical Co. in Basel, Switzerland studied during 1947–51, the crystalline alkaloids reported by Indian chemists and found them to be moderately sedative and hypotensive. Pharmacological tests revealed that the potent activity of the crude drug resides in the non-crystalline oleo-resin fraction and from this Mueller *et al.*<sup>4</sup> isolated a new alka-

loid, reserpine (Serpasil) by adsorption chromatography over alumina. It was made available for therapeutic use in 1952. Had the Indian chemists examined the oleo-resin fraction using column chromatography even after Vakil's publication<sup>3</sup>, they could have isolated reserpine. In the light of these facts, it is surprising to note that reserpine was used in NIMHANS by 1950<sup>1</sup>.

Reserpine was found to be a much weaker base than the alkaloids ajmaline, ajmalinine, ajmalicine, serpentine, etc. Powdered whole root of *R. serpentina* contains total alkaloids, of which reserpine accounts for about 50% of the total activity. Two other *Rauwolfia* alkaloids

which possess reserpine-like activity strong enough for use in treating hypertension are deserpidine and rescinnamine<sup>5</sup>.

Although *R. serpentina* was used in India for at least five centuries in treating the mentally affected, trial in psychotherapy outside India was carried out only after the discovery of reserpine and demonstration of its therapeutic properties when the powdered whole root was used in the West with moderate success in a wide variety of mental disorders characterized by excitement (mania) rather than depression.

The discovery of reserpine was the first instance of correlation between biological activity and use in traditional medicine in India. According to Lele<sup>6</sup>, there is scope for research on Ayurvedic drugs using current knowledge about molecular pharmacology to substantiate their use by the findings of modern science.

1. Jain, S. and Murthy, P., *Curr. Sci.*, 2009, **97**, 266.
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5. Cocolas, H. G., In *Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry* (ed. Doerge, R. F.), J. B. Lippincott Company, Philadelphia, 1982, pp. 536–537.
6. Lele, R. D., *Pharma Times*, 1999, **31**(7), 15.

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## Frozen gene bank at frozen mountain

The Convention on Biological Diversity (CBD) that was adopted at Rio de Janeiro in 1992 calls for the conservation, sustainable and equitable use of biodiversity. However, the extinction of species and erosion of genes continue to occur at an alarming rate<sup>1</sup>. The modern techniques for germplasm storage especially based on cryopreservation are expensive and the permafrost storage is a preferred alternative. In Ladakh, the Defence Institute of High Altitude Research (DIHAR), a constituent laboratory of the Defence Research and Development Organisation, which has been mandated to carry out the sustainable agro-animal research in high altitude areas has created a 'permafrost-based germplasm storage facility' at 'Chang-La' situated at an altitude of 5360 m above mean sea level (amsl). This will serve as a safety net for current and future food security in an era of global warming and climate change. The Minister of State for Defence, M. M. Pallam Raju, inaugurated this facility on 25 September 2009. Apart from India, only Norway has the permafrost storage facility in the world.

The permafrost storage is a national facility which will keep germplasm at  $-4^{\circ}\text{C}$  to  $-20^{\circ}\text{C}$  temperature inside the structure with 10–20% moisture. The structure is designed on 'black box condition' storage mechanism, the storage boxes remain the property of the institu-

tion that submits to the germplasm bank and could be opened only with the depositor's permission, avoiding conflicts pertaining to intellectual property rights. There is a need to strengthen our infrastructure for the conservation, sustainable and equitable use of plant genetic resources<sup>2</sup>. This is why the preservation of at least a small seed sample of existing variability in long-term storage structures as in Chang-La assumes urgency.

The seed storage problems are more common in India, because a large part of the country has predominantly hot, humid, tropical and sub-tropical climate with great variation in temperatures, rainfall and relative humidity across the year. Hence for cost-effective conservation of important plant genetic resources for food and agriculture (PGRFA) as safety duplicates, it requires exploration and use of alternative methods of seed storage.

Fortunately, in Himalayan region there are various places with sub-zero temperatures and low relative humidity conditions. Capitalizing on these natural factors, DIHAR has selected Chang-La (75 km from Leh) for the creation of zero energy-based germplasm storage facility. The present structure at Chang-La is for the successful, cost-effective, safe and long-term conservation of valuable PGRFA in the form of safety duplicates. The other objectives with which the present facility is created include: (i) to

study the seed storage behaviour of a wide range of orthodox seed crops in terms of seed viability, genetic stability and health at definite intervals under the natural permafrost conditions vis-à-vis artificial low temperature conditions (long-term storage module in the gene bank), (ii) calculation of cost effectiveness of conservation of plant germplasm in high altitude areas vis-à-vis long-term storage module in the gene bank, and (iii) to use the natural permafrost conditions on continuous basis for conservation of a selected set of important plant germplasm. In conclusion, permafrost-based germplasm storage at Chang-La is an economically viable possibility that allows long-term preservation of valuable and endangered plant germplasm at the frozen mountain for current and future food security.

1. Swaminathan, M. S., *Science*, 2009, **325**, 517.
2. Swaminathan, M. S., *The Hindu*, 12 March 2009.

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