

## Differences in ayurvedic medicine and herbal medicine

The article entitled 'Side effects of some medicinal plants' by L. M. Gupta and R. Raina (*Curr. Sci.*, 1998, 75, 897-900), appears to be misleading and gives wrong information about ayurvedic herbal medicine. Most of the toxicological studies are based on experimental animals, using extracts, isolated compounds and oils which are not used as such in clinical practice. Therefore the extrapolation of such observations to humans, regarding the use of ayurvedic medicines, made using these plants as ingredients, is not proper.

It is important to note that there is difference in the terms 'side effect' and 'over-dose'. Side effect means unwanted biological property at the therapeutic dose and over-dose is self-explanatory. According to pharmacological principles, every medicine is toxic, after a certain concentration. If one talks of adverse effect of a substance with regard to over-dose, then almost everything is toxic.

The medicines listed in the article are important ones in the ayurvedic pharmacopoeia. They are wonder-drugs if taken as recommended in the ayurvedic literature (method of preparation and dose of administration). Several other important drugs of ayurveda, such as *S. nux vomica*, *S. anacardium*, *C. mukul*, *M. pruriens*, etc. (Rasayana drugs) have several toxic ingredients, but are still used after purification.

It is important to note that ayurvedic methods describe the purification of raw medicines (sodhan) before use in the preparation of different formulations for

clinical use. They are never used directly. The concentration of these medicines in the final formulation is very low compared to the dose of the extract, tested in the animal models.

Based on these facts, WHO has recommended the clinical use of ayurvedic medicines, without any clinical trial, provided it is safe (WHO guidelines for the use of alternative medicines). Further, since they have no side effects (in therapeutic concentrations), these medicines could sustain themselves for thousands of years.

Regarding the toxic studies made by different scientists, it is important to note that these have been conducted using raw drugs (generally not used in ayurveda) and organic extracts (which destroy the holistic concept of medicinal plants) in high concentrations (over-dose).

The conclusion drawn by the authors to avoid herbal medicines is not acceptable. One could strictly follow the ayurvedic texts in preparing these herbal medicines. Medicines made from plants, but not as per ayurvedic literature should not be treated as a safe herbal preparation. A clear cut demarcation in these products must be made at both the level of drug controller as well as the consumers.

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### Response:

Our article was intended not to be a reflection on any system of medicine (ayurveda or else), but to highlight the potential toxicity/adverse effects of ingredients of some commonly used medicinal plants. Moreover, WHO has also sounded a note of caution regarding the use of plants as medicaments and the relevant lines are reproduced below:

'Prolonged and apparently uneventful use of a substance usually offers testimony of its safety. In a few instances, investigations of the potential toxicity of naturally-occurring substances widely used as ingredients in these preparations have revealed previously unsuspected potential for systematic toxicity, carcinogenicity and teratogenicity. Regulatory authorities need to be quickly and reliably informed of these findings. They should also have the authority to respond promptly to such alerts, either by withdrawing or varying the licences of registered products containing the suspect substance, or by re-scheduling the substance in order to limit its use to medical prescription'. (Guidelines for the Assessment of Herbal Medicines - Programme on Traditional Medicines, World Health Organization, Geneva 1991, WHO/TRM/91.4, p. 2).

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## NEWS

### Chemists celebrate 50 years of India's independence with a national symposium in chemistry

While the nation celebrated 50 years of India's independence in many ways, some of the chemists wanted to do their bit slightly differently - by doing what they know best - by organizing a chemical research symposium. The result was the 'National Symposium in Chemistry' (NSC) held at the National Science Seminar Complex, IISc campus, Bangalore during 27-30 January 1999. Ably

assisted by S. Chandrasekaran and his colleagues at the Indian Institute of Science, Bangalore, C. N. R. Rao, President, Jawaharlal Nehru Centre for Advanced Scientific Research had organized it. Funds came from a variety of sources. It was a 4-day no-nonsense marathon session, including 19 plenary lectures, 21 invited lectures, 17 invited short presentations and two poster sessions with

125 posters displayed. There were 8 distinguished speakers from abroad and a large number of participants from all over the country.

The special feature of the symposium was that it encompassed all of chemistry, cutting across all traditional branches of chemistry. It included quite a number of papers in materials and biology portending the nature of things to come.

The topics covered included soft lithography (G. M. Whitesides), the secret of open-framework metal phosphates and related structures (C. N. R. Rao), role of chemistry in inorganic materials synthesis (J. Gopalakrishnan), electrochemical synthesis of inorganic solids (V. Kamath), architecture and function of metal-rich compounds (A. Simon), complexes with 'naked' group 15 elements as ligands (M. Scheer), electronic and magnetic properties of molecular materials (S. Ramasesha), insights into membrane biology through molecular design of lipids and amphiphiles (S. Bhattacharya), an interdisciplinary approach to peptidomimetic drug design (M. Goodman), local dielectric environment of DNA (K. N. Ganesh), *de novo* protein design (P. Balaram) and cobalt catalysed synthesis of beta-turn mimics as models for the bio-active conformation of HIV-1 protease inhibitors (J. Iqbal).

That catalysis can be studied and understood in greater detail using clean surfaces and modern tools of molecular beams, and ultrahigh vacuum techniques was demonstrated by the lucid presentation of D. A. King. The audience was spellbound by the talk of R. D. Levine on chemistry under extreme conditions. He explained why the air does not burn by itself and how extremely high temperatures could be produced by supersonic beams of clusters on impact with surfaces. While D. Ranganathan illustrated the formation of tubes of cyclic peptides using the south Indian medhu vadas as models, U. Maitra demonstrated the formation of gels using cholic acid and its derivatives. A. Chattopadhyay gave an eloquent account of how one could blow soap bubbles and still come up with membranes that would mimic the biological cousins, particularly when you have no labs and no funds to speak of. A. K. Mishra showed how to use fluorescent ES IPT

probes for liposome membranes. K. Bhattacharyya laid special emphasis on the use of ultrafast lasers in the study of organized assemblies.

'20th century was the century of the covalent bond and the 21st century will see mostly weak interactions' was the message conveyed by G. R. Desiraju. The grey area in the continuum of weak interactions between van der Waals interactions and the hydrogen bond was emphasized by him. It was complemented by the talk of P. Chakrabarti on nucleophilic-electrophilic interactions in crystals of organic molecules and proteins. S. Chandrasekhar was concerned at the unmindful use of solvents in organic synthesis and pointed out that it is possible to do 'Green' chemistry in the solid state. After all, if nature could do it, why can't we?

'Photo-induced electron transfer (PET) processes in fullerene based donor-acceptor systems' was the subject of the talk by M. V. George. One learned that PET could be used for organic synthesis from the work of G. Pandey. R. N. Mukherji showed how one could model the oxygen evolving complex of photosystem II and manganese containing catalase. M. Palaniandavar spoke on structural models for the active site in galactose oxidase.

While M. Shibasaki reviewed the recent progress in heterobimetallic asymmetric catalysis, P. Mathur dwelt on the influence of main group elements on cluster synthesis. E. D. Jemmis discussed from a theoretical point of view new chemistry derivable from the main group analogies. S. Sivaram showed that he could control the synthesis of functional polymers and R. Ramakrishnan pointed out that you could, in principle, fine-tune the colour of emission from conjugated polymers. One was surprised to learn that there could be hydrophobic receptors for anions from the talk of A. G. Samuelson.

While J. S. Yadav spoke on the virtue of total synthesis and its academic and commercial value, M. K. Gurjar presented a case study of how Indian scientists could undertake contractual research on synthetic strategies for biologically and industrially relevant compounds. K. K. Balasubramanian argued that traditional synthesis of small molecules should not be ignored and that nature has lots of surprises for us, if only we cared to look.

*In situ* spectroelectrochemistry was the subject of R. Ramaraj's talk. Metalloid

porphyrin systems hold fascination for B. G. Maiya. Vairamani showed how mass spectrometry could be used for chiral discrimination.

That there are classical solids and there are quantum solids and that the study of the latter requires special techniques is what one learnt from C. Chakravarty. Whether Indian sadhus levitate or not, molecules inside zeolites can and do and that the same can be exploited to separate mixtures was what S. Yashonath tried to convey.

The real work force of academics, that is, the research scholars, had shown up in large numbers and were presenting the canvas of Indian chemistry scene in two poster sessions. It was dominated by organic and inorganic chemistry, as one could guess and understand, given the Indian conditions. There was no lack of enthusiasm on the part of the exhibitors of the posters nor on the part of the attendees. As a matter of fact, many senior chemists made it a point to talk to the young and upcoming chemists and provided the necessary encouragement. Unfortunately the poster sessions were somewhat cramped. But given the constraints of space and time, one could not blame the organizers.

All good things must come to an end and so did the NSC in the evening of 30 January 1999. Most of the participants stayed on till 5.00 p.m., till the completion of the last talk by P. Ramamurthy on, 'Excited single state reactions of phenosafranin'. They all agreed to meet next year in Hyderabad.

Yes, it is not going to be a one-time affair, as explained by C. N. R. Rao. As one who has occupied the prime position in chemistry in India in the last four decades, he proposed that a Chemical Research Society\* be founded so that we could all meet at regular intervals to discuss our research, not as inorganic chemists or organic chemists or physical chemists or biochemists, but as chemists – well rounded chemists, learn from each other and keep the chemistry flag flying high. Everybody agreed. After all, we owe it to the nation. It has invested in us!

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\*The Chemical Research Society will have its registered office in Bangalore, with C. N. R. Rao as the founder president. Annual membership: Rs 200. Life membership: Rs 2000. The mandate is to hold annual meetings of chemistry, honour the accomplished ones, encourage the younger ones, take stock of the status of chemistry research and strive to improve it. All chemists in the country are invited to join by sending a draft/cheque to S. Chandrasekaran, Secretary, Chemical Research Society, Department of Organic Chemistry, Indian Institute of Science, Bangalore 560 012.