



NGRI signs MoU with GEMRC IPE

The National Geophysical Research Institute (NGRI), Hyderabad, has signed a Memorandum of Understanding (MoU) with GEMRC IPE, Russia, on 17 November 2006 after detailed discussions with Magnetotellurics group headed by Dr T. Harinarayana, on various research projects. The MoU was signed by Dr V.P. Dimri, Director, NGRI and Prof. Vjacheslav V. Spichak, Director, GEMRC. With the signing of the MoU, GEMRC and NGRI have mutually agreed to collaborate with each other, specifically in the field of "Electromagnetics". Both the parties have agreed for future scientific cooperation in the following areas:

- Application of artificial neural network technology for geophysical data interpretation
- Construction of 3D geoelectric models from Magnetotelluric data measured in India
- Promotion of joint project on EM tsunami alarm system (organization of bilateral colloquium in Moscow in 2007)

Two or three experienced NGRI research students in the field of magnetotellurics will carry out their Ph.Ds in GEMRC IPE during 2007-2009 under joint supervision. The financial support will be provided by NGRI through DST (India) and GEMRC IPE through RAS (Russia) under ILTP programme. The MoU would remain valid for two years from 17 November 2006 and is renewable on mutual consent.



Dr V.P. Dimri, Director, NGRI (centre) and Prof. Vjacheslav V. Spichak, Director, GEMRC (right) with the MoU documents. Seen on the left is Dr. T. Harinarayana, Head, Magnetotellurics Group.



NML's Bio-mimetic Payload on board SRE-1 studies synthesis of Nanocrystals under Microgravity Conditions

The Polar Satellite Launch Vehicle (PSLV-C7) that took off from Satish Dhawan Space Centre (SDSC) SHAR, Sriharikota on 10 January 2007 launched into orbit the following four satellites: the India's Space Capsule Recovery Experiment (SRE-1) and the 680 kg Remote Sensing Satellite CARTOSAT-2, Indonesia's LAPAN-TUBSAT and Argentina's six kg nano satellite, PEHUENSAT-1. Among these, of special significance was the SRE-1, which was successfully recovered on 22 January 2007 after being maneuvered to re-enter the earth's atmosphere and descend over Bay of Bengal about 140 km East of Sriharikota. This has taken India into the elite club of countries that possess the satellite re-entry technology. It was the joint effort of Vikram Sarabhai Space Centre and Indian Space Research Organisation.

The SRE-1 provided important technology inputs in navigation, guidance and control during the re-entry phase, hypersonic aerothermodynamics for reusable thermal protection system, recovery through deceleration and floatation, besides acquisition of basic technology for reusable launch vehicle. It demonstrated India's capability pertaining to orbiting platform for performing experiments in microgravity conditions and recovering it after the completion of the experiments.

During the 12 days' stay of SRE-1 in space, two major experiments were successfully conducted on board under microgravity conditions. One of the experiments was related to study of metal melting and crystallization under microgravity conditions. This experiment, jointly designed by the Indian Institute of Science, Bangalore and

Vikram Sarabhai Space Centre, Thiruvananthapuram, was performed in an Isothermal Heating Furnace. The second experiment involved National Metallurgical Laboratory (NML), Jamshedpur's Bio-mimetic Payload to study the synthesis of nano-crystals under microgravity conditions. This experiment would help in designing better biomaterials in closest proximity with natural biological products.

The successful launch, in-orbit operations, on board experiments and reentry of SRE-1 has demonstrated India's capability related to aero-thermal deceleration and flotation systems, guidance and control. SRE-1 is a beginning towards low-cost microgravity experiments in space science and technology. More of such experiments would pave the way for reuse of space vehicles.

Synthesis of a new dicarbanionic initiator for application in synthesis of SBS triblock copolymers

Thermoplastic elastomers are useful materials both from the industrial as well as academic point of view. They enjoy an intermediate position between rubbers, which are soft, flexible and elastic and thermoplastics, which are rigid. These materials are used as specialty elastomers in adhesives, noise reduction applications, and production of foams, films, tapes,

and cable sheathing. Furthermore, applications of thermoplastic elastomers in bio-medical field are rapidly increasing.

Synthesis of well-defined polymers and copolymers with predetermined molecular weights, narrow polydispersities, precisely controlled end group functionalities and chain topologies is of contemporary interest in polymer

chemistry. In principle, 'living' polymerization can make such macromolecules with important architectures such as block copolymers. Among different block copolymers, ABA triblock copolymers constitute an important class. The most well-known among these being styrenic thermoplastic elastomer with two glassy end blocks connected to an amorphous



polydiene block.

One of the most versatile methods for the synthesis of such triblock copolymers involves the use of a dicarbanionic initiator with a two-step sequential monomer addition sequence. However, one major difficulty encountered is the limited solubility of dicarbanionic initiator in non-polar solvents, which are normally required for the preparation of a polybutadiene or polyisoprene central block with a high percentage of 1,4-polybutadiene or 1,4-cis-polyisoprene units. This is required for attaining optimal elastomeric properties. Development of an ideal difunctional organolithium initiator, soluble in hydrocarbon solvents for the anionic polymerization of dienes and/or vinyl aromatic hydrocarbon monomers has been a challenge that

is unmet for over four decades.

Dr Prakash Wadgaonkar and his team at National Chemical Laboratory (NCL), Pune, in collaboration with Prof. Y. Gnanou from University of Bordeaux, France have recently discovered a new dicarbanionic initiator by lithium-halogen exchange reaction of dibromo compound with sec-butyllithium. This dilithiated initiator is totally soluble in hydrocarbons in the absence of any additive and efficiently generates well-defined polybutadiene telechelics and poly (styrene-*b*-diene-*b*-styrene) triblock copolymers with high 1,4-units in the polybutadiene segment.

The dibromo compound *viz* 1-bromo-4-(4'-bromophenoxy)-2-pentadecyl benzene used for synthesis of dicarbanionic initiator

was derived from 3-pentadecyl phenol which in turn is obtained from cashew nut shell liquid (CNSL), a naturally occurring plant derived material.

This is the first example of a dicarbanionic initiator which is totally soluble in non-polar media without any additives, which allowed the synthesis of well-defined polybutadiene telechelics with a high percentage of 1,4-PB units (91%). This initiator proved to be very efficient in providing SBS triblock copolymers containing 91% 1,4-microstructure polybutadiene segment with good mechanical properties (ultimate tensile strength higher than 30 MPa and elongation at break of 1000%).

Two patent applications covering this work are pending.



Styrene-Butadiene
Styrene triblock
polymer



Indian Institute of Integrative Medicine, Jammu

R&D Highlights

The Indian Institute of Integrative Medicine (IIIM, erstwhile RRL), Jammu, is making significant R&D contributions that are not only relevant to India but are also globally acceptable. Accomplishments during the last couple of years include:

Technology Transfers

End to end technology package of *Hypericum perforatum* (St. John's Wort)

Complete protocol for

micropropagation, agrotechnological package, chemical standardization *in respect of Hypericum perforatum* have been evolved on the basis of two major molecules — hypericin and hyperforin, and six minor compounds. The drug thus



standardized on the basis of HPLC and LCMS conforms to the US pharmacopoeial standards with hypericin (up to 0.3%) and hyperforin (> 3%). In comparison, the other commercially available preparations of *H. perforatum* on Indian market were found to contain hypericin, but the hyperforin (most important ingredient) content was found to be nil to negligible in almost all the tested samples.

These marker molecules are now available with the laboratory in large quantities. Earlier, these molecules were only available at exorbitant costs with only a couple of companies world over.

The entire work on *Hypericum* was supported by Nicholas Piramal Group and the formulation conforming to USP has been developed by the laboratory for this company for captive and international market.

Natural Calicitriol — A drug for skin diseases

A physiologically active form of Vitamin D3, Calicitriol plays an important role in influencing the calcium uptake in intestine and bones. The drug is used for the prevention of osteoporosis and skin disorders like psoriasis. The natural drug is present in traces in a plant source. IIIM has developed an efficient and novel process to enrich this molecule from the leaf powder and to extract it in suitable medium. The technology package has been up scaled and passed on to M/s Genova Biotechniques, Hyderabad, on consultancy basis. The company has set up a production unit in Hyderabad, based on the technical

know-how of the institute and has also tied up with M/s Ochoa Pharmaceuticals for marketing the product under their brand name.

Pharmacological data of a herbal formulation as dietary/food supplement

In a record time of 7 months the institute has completed toxicity studies as per USFDA/OECD Guidelines and preclinical studies for generating pharmacological data on a herbal formulation as a dietary / food supplement for sexual behaviour changes. The technical report along with the video film on the efficacy of formulation on animals as aphrodisiac has been passed on to M/s Flex Foods Ltd, Dehra Dun.

Herbal formulation as hepatoprotective

After years of dedicated work, IIIM, Jammu has developed a single herb formulation as hepatoprotective against alcoholic and viral cirrhosis. The product is standardized based on two identified chemical markers. After conducting the proof of concept in humans, M/s Madley Pharmaceuticals Ltd, Mumbai, has launched the product as LIV-1 in both tablet and syrup forms.

Development of Micropropagation Protocols

***In vitro* propagation and conservation of *Atropa acuminata* Royle ex Lindl.**

A tissue culture procedure has been developed for multiplication and conservation of *Atropa acuminata* Royle. ex Lindl. by induction of axillary shoot proliferation. *In vitro* raised plantlets were hardened and successfully transferred to field.

Micro-propagation of *Hypericum perforatum*

Rapid *in vitro* and *ex vitro* micropropagation protocols have been developed at RRL-Jammu for mass propagation of the chemically identified 'elite' strains of *Hypericum perforatum* collected from the wild sources. More than one lakh plantlets developed through above protocol have been successfully raised in the experimental farms of IIIM Branch, Srinagar.

Micro-propagation of *Hedychium spicatum* :

Rapid *in vitro* micropropagation protocol has been developed at the institute for mass propagation of the chemically identified 'elite' strains of *Hedychium spicatum* collected from the Darjeeling Hills. Greenhouse hardened plants were transferred to field. A successful protocol with 99% root formation and 80–85% field survival has been developed.

Micro-propagation of *Celastrus paniculatus*

The institute has developed the complete protocol to regenerate *C. paniculatus* by culturing excised embryos via organogenesis on the



standardized selective conditions and sequence of media. The developed procedure can be adopted for large-scale propagation and conservation of this medicinally important plant species which otherwise figured as threatened.

Micro-propagation of *Lavendula officinalis*

Protocol or efficient regeneration system through forced axillary bud induction and organogenesis in *Lavendula officinalis*, an important aromatic plant, has been developed and standardized.

Engineering Design Capabilities

Multipurpose herbal extraction pilot plant for Malaysia

M/s Tropical Botanics SDN BHD, Malaysia, has retained IIIM as consultant to undertake design, drawing, installation, commissioning, validation and testing of multipurpose herbal extraction pilot plant in Malaysia. IIIM would also help the party in short listing the appropriate fabricator in India and also to demonstrate the working of the plant for processing herbals / botanicals both in India and Malaysia. Based on the performance of the pilot plant, the company intends to retain IIIM as their consultant for the designing of the production plant as well.

Solvent Extraction unit for herbs

A multi-functional solvent extraction unit was designed and fabricated in house for the production of herbal extracts. The capacity of this unit is 15 kg per batch. Currently it is being used for the production of standardized extracts of several medicinal plants cultivated in the demonstration fields at IIIM, Jammu and Srinagar.

Multi-functional pilot scale fermentor

A microprocessor controlled 75 to 100 litre fermentor with all required process controls was designed by Dr G. N. Qazi, Director, IIIM and his group and fabricated under the guidance of RRL by M/s Andel Industries, Mohali. Such plants have been successfully installed and commissioned at a number of places under consultancy programme. The total cost of each such unit is approximately Rs 1.5 million. The plant has all the features of an R&D pilot scale fermentor wherein distributed parameters and variables can be studied. It can also be used as a production plant for high-value low-volume products, even for genetically engineered organisms.

Production plant for D-gluconates

A single-step fermentation process, wherein starch hydrolysate is directly converted to gluconates of calcium, sodium, barium etc. has been developed. The process has the

advantage over the existing methods for being highly cost effective less energy intensive and environment friendly. The gluconate salts are used in nutraceuticals, human and veterinary pharmaceuticals, food and cosmetic industry. The technology has been transferred to M/S Prathistha Industries Ltd, Hyderabad and a Production plant of 1500 tonnes per annum capacity has already been commissioned. In recognition of this achievement the institute was awarded CSIR Technology Award 2001, Vasvik Award 2000 and 64th All India Industrial Award 2004 for this technology package.

Production plant for bio fertilizers and bio control agents

Based on the institute's technology, M/s Prathistha Industries Ltd, Hyderabad, has commissioned a production unit for bio fertilizers and bio control agents. The products like bio potash and bio zinc are being already marketed by the company throughout the country.

New Research Projects

Several new projects have been finalized or are under negotiations with world-renowned pharmaceutical companies such as: *Proctor & Gamble Worldwide, USA; M/s INDIGENE Pharmaceuticals Pvt. Ltd; M/s Ochoa Laboratory, Ltd, New Delhi; M/s Zandu Pharmaceuticals, Mumbai; M/s Nicholas Piramal India, Mumbai.*



Workshop on Proteomic Insight into Plant-Insect Interactions

The National Chemical Laboratory (NCL), Pune, organized a workshop on Proteomic Insight into Plant-Insect Interactions, under the Max Planck Society-India Partnership Programme, during 12-15 December 2006. About 60 participants drawn from academic institutes, research laboratories as well as industries in Germany and India attended this workshop. The aim of the workshop was to discuss and come up with novel approach to study plant-insect interaction at the molecular level. Sustainable agriculture is the thrust area and hence research in this field has prime importance. In this context, comparative proteomic analysis in model systems can enhance our understanding of similar processes in crop plants at the molecular level by offering biochemical explanations.

The workshop started with welcome remarks by Dr Vidya Gupta, Scientist, Plant Molecular Biology Group of Biochemical Sciences Division at NCL and one of the conveners of the workshop. She spoke on prospects of plant biotechnology in India, where agriculture is the main profession in rural parts and food security along with economic security is the top priority for the nation as a whole. She emphasized the role of plant biotechnology and plant scientists in different sectors including cash crops, staple food crop, nutrition, and human health development to meet the food, nutrition, economic security and upliftment of existing

population. She also talked about the importance of plant biotechnology in medicinal plant development and commercialization. She focused on the issues like public-private relationship and international collaborations. This was followed by visionary talks of various distinguished speakers covering biological educational, agricultural priorities and prospects, academic and industrial opportunities in biotechnology, and the status of biopesticides in India.

The workshop had six major sessions on related themes such as: (i) introduction to Indian agriculture, plant biotechnology, and biology education, (ii) technologies for biotechnology, (iii) plant defenses, (iv) approaches to study plant-insect interactions, (v) plant-insect interactions, and (vi) post-ingestive proteomics. Prof. R.B. Deshmukh, Vice Chancellor, Mahatma Phule Krishi Vidyapeeth, Rahuri., gave a brief account of the current scenario of Indian agriculture and the future needs to sustain over a billion people. Agriculture contributes about 22% to India's GDP and the agricultural exports constitute nearly 11.2% of total national export. He informed about the production and productivity of cereals, pulses, oilseeds, fruits, vegetables, fish, poultry, milk and milk products in the country. He urged to increase the food production to 245 million tonnes by the year 2020. He further added that increased productivity, greater value addition, cost and quality competitiveness would help

achieve the focused demands. Among the different strategies involved in controlling insect pests of crop plants, biopesticides are of growing use.

Dr M.V. Deshpande from NCL spoke about the current status of biopesticides in Indian agriculture and discussed different models, concepts and possible ways to increase biopesticides awareness in farming community. Biological control of plant fungal pathogens and pests involves the use of microbial antagonists such as bacteria, viruses, fungi and their products like enzymes, inhibitors and antibiotics, plant products, insect pheromones, etc. Overall biopesticide market in India is about 4 million USD per year. He suggested to adopt food industry model instead of chemical industry model for increasing the use of biopesticides and to launch "do it yourself" concept for spreading of this eco-friendly technology in the farming community. Dr Manvendra Kachole from Dr Babasaheb Ambedkar Marathwada University, Aurangabad, focused on the biology education in India during last 60 years, current status and challenges. He discussed issues related to education in medicine, agriculture and technology relevant to biosciences along with some of the problems like changing attitudes, managing socio-economic pressures, etc. in these areas. He suggested that although more options are available, the future prospects of the system and students depend on decisions, policies and actions taken by the

stakeholders in the immediate future.

During plenary talk, Prof. Ian Baldwin, Director, Max Planck Institute (MPI) for Chemical Ecology, Jena, Germany and one of the conveners of the workshop, spoke about the plant-insect interactions in the context of ecology and biotechnology. He illustrated the use of transgenic native tobacco (*Nicotiana attenuata*) plants which have been rendered 'deaf' or 'mute' in their volatile vocabulary to study

volatile-mediated interactions among plants and between plants and their herbivores; incapable of producing particular direct defenses to examine the interaction among different defense metabolites and incapable of producing or perceiving particular oxylipins or siRNAs that mediate induced defense responses.

Dr Aleš Svatoš from MPI for Chemical Ecology, Jena, Germany, spoke on the mass spectrometric technologies for proteomics and

metabol(n)omic studies. In his presentation he summarized the current technological innovations like Q-tof, Linear trap, Orbitrap, GC/GC-TOF and their utility in the omics studies. He specifically focused on the ongoing MPI CO ProtLab and MassLab projects like metabonomic profiling of plants (*Arabidopsis thaliana* and *Tropolum majus*) and insects (*Pieris rapae* and *Ixodes ricinus*). He discussed in details the methods used for secondary metabolites structure elucidation. Plant proteins are known to be involved in disease and insect resistance.

Prof. N. Sakthivel from Department of Biotechnology, Pondicherry University, talked about the use of antimicrobial proteins for enhancing disease resistance in tobacco. He discussed the isolation of genes encoding for chitinase and lipid transfer protein from barley and wheat, its over expression in *E. coli* and the antifungal activity of purified chitinase against important diseases like blight of tobacco, leaf spot of tea, leaf spot of clover, brown spot of rice, grain discoloration of rice, and sheath blight of rice. Similarly, he showed the antifungal activity of lipid transfer protein against root necrosis of banana, cotton wilt, sheath blight of rice and sheath rot of rice. He also presented his work on transfer of chitinase and lipid transfer protein gene into *Nicotiana tabaccum* cv. Samsun using *Agrobacterium*-mediated plant transformation method.

Dr Bharat Char from Mahyco Research Centre, Maharashtra Hybrid Seeds Company Ltd, Jalna, in his talk focused on insect-tolerant brinjal: a public-private partnership venture. He spoke about the



Dr Vidya Gupta delivering the welcome address



Dr Ashok Giri giving overview of research activities at NCL



Dr Aleš Svatoš explaining recent developments in proteomics



Prof. Ian Baldwin giving his plenary talk



importance of brinjal as nutrition and cash crop for poor farmers. As brinjal fruit and shoot borer (FSB), *Leucinodes orbonalis*, is the most destructive insect pest for brinjal in South Asia, Mahyco has developed a transgenic brinjal expressing the *cry1Ac* gene that can withstand FSB attack. Mahyco has developed unique public-private partnership project, which is coordinated by the Agricultural Biotechnology Support Project II (ABSPII) programme. This project includes various Indian and foreign institutes, universities and private sectors. He also elaborated on the development of a biosafety package for insect-tolerant brinjal, encompassing food and environmental safety. Prof. Hans Peter Saluz from Leibniz Institute for Natural Product Research and Infection Biology, Jena, Germany, spoke on strategies to study protein/DNA-interactions *in vivo*. He discussed rapidly evolving technology that has been developed to unravel the structure of DNA as it occurs in the living cells. He spoke about the methodology, mainly used for studying protein/DNA interactions monitors on the DNA the impact of bound proteins, cross-linking proteins to DNA by UV light or trapping DNA-binding proteins in 'hybrid systems', which provide information about the protein factors bound.

Dr Susanne Preiss from MPI for Chemical Ecology, Department of Entomology, Jena, Germany, discussed the strategies to study insect proteomes of generalist and specialist *Lepidoptera*. She shared her research experience working with lepidopteran species *Heliothis*, *Helicoverpa*, *Putella*, *Spodoptera*, *Ostrinia* especially for gut enzymes,

their spatial organization and metabolic functions. She talked about the subtractive and comparative proteomic approaches to analyze the qualitative and quantitative changes of the interacting protein networks and understand how they are able to maximize digestive performance while neutralizing new toxins and other plant defense compounds. She also detailed the analysis of insect subproteomes and techniques for differential gel electrophoresis (DIGE). *Helicoverpa armigera* is one of the major pests of cotton, pigeonpea, chickpea, sunflower, tomato, sorghum, maize, and a range of fruits and vegetable crops. Hence development of crop cultivars with resistance to *H. armigera* has a great potential for use in increasing pest management, particularly under subsistence farming condition in the developing countries. Dr H. C. Sharma from ICRISAT, Patancheru, highlighted plant-insect interaction, role of IPM in controlling *H. armigera*, exploitation of natural variation for insect resistance and development of cultivars that are resistant to insect pest. This approach has some limitations and hence the progress is slow. One of the reasons for slow progress in developing *Helicoverpa* resistant cultivars is the difficulty involved in ensuring optimum insect pressure for resistance screening. Similarly, the sources of insect resistance identified in crop have not been utilized effectively. He informed different mechanisms like antixenosis for oviposition and feeding, antibiosis and tolerance, which are operational in plants through different component traits for resistance against *H. armigera* in

various crop species. He suggested selection of important morphological traits such as shape and size of trichomes, hairiness, leaf shape and size, boll/pod wall thickness while developing insect resistance cultivars in cotton.

Dr Ashok Giri from PMB Group of NCL and one of the conveners of the workshop, gave an overview of research activities in plant insect interactions of PMB group. He also discussed the recent advances in this field which helped German participants to know the NCL's progress in this area. NCL has been collaborating with Mahatma Phule Krishi Vidyapeeth (MPKV), Rahuri, a leading agricultural university in India, for several years on the chickpea-*Helicoverpa armigera* project.

A field visit to MPKV was organized on the last day of the workshop to show several winter crops at researcher's fields. Insect damage to chickpea crop was also shown. Discussions with area farmers gave an idea about insect pests and the integrated pest management strategies practised by farmers. The workshop culminated in fruitful conclusions and suggestions for further developments in this field and enhancing cooperation between various participating institutes. Keen interest was shown by all participants to carry out research for sustainable agriculture using proteomic tool. This workshop also enabled the formation of a useful network of scientists from various institutes, to discuss the fruitful results of their work and cooperate. A short tour to view the NCL facilities was also organized.

National Workshop and Exhibition on Engineering Metrology & Quality for Growth

The Mechanical Engineering Research and Development Organisation (MERADO), Ludhiana, organized a two-day national workshop and exhibition on 'Engineering Metrology & Quality for Growth' on 15-16 February 2007. About 60 participants attended. The prominent organizations who deputed their delegates included: Naval Dockyard, Mumbai; 'National Research Technology Consortium, Parwanoo; M/s Gabriel India Ltd, Parwanoo; M/s Hero Majestic, Ludhiana; M/s Swastik Traders, Ludhiana; M/s G.S. Textiles Ltd, Ludhiana; M/s International Tractors Ltd, Hoshiarpur; M/s Munjal Casting Ltd, Ludhiana and M/s Guru Teg Engineering Co., Ludhiana.

Shri A.S. Mittal, Vice Chairman of M/s International Tractors Ltd, Hoshiarpur, was the chief guest and inaugurated the workshop and exhibition. Shri Mittal, in his address, mentioned the important role of metrology in quality improvement and stressed the need of application of metrology in the manufacturing technologies. He also acknowledged the significant contribution of CMERI/MERADO for the development of 'Sonalika'

Dr R.P. Singhal, Chairman, Metrology Society of India, and Head of Physico-mechanical Measurements, National Physical Laboratory, New Delhi, gave keynote address highlighting the status of metrology and its

usefulness in quality improvement and growth in engineering industry and other related fields.

Prof. L.S. Tanwar from Netaji Subhash Institute of Technology, New Delhi, highlighted the importance of traceability in calibration and certification. Dr Ashok Kumar, Scientist & Head, Ultrasonics, NPL, focused on the application of some of the latest techniques in manufacturing sector. Other eminent speakers Dr P.S. Satsangi from Punjab Engineering College, Chandigarh; Shri. C.P. Khatter, Principal Director, CIHT, Jalandhar; Prof. Jatindar Kapur from GNEC, Ludhiana and Shri Paramjit Singh of Institute for Autoparts Technology, Ludhiana, covered several important aspects related to Metrology. Dr Ranjan Sen, Head, Metrology section of CMERI, Durgapur, spoke on 'Uncertainty of Measurement', while Shri Swapan Burman covered the 'CMM Parametric Errors'.

Earlier, Scientist Incharge Cdr. V.R. Dahake welcomed the participants. He expressed the hope



The inaugural session of National Workshop and Exhibition on Engineering Metrology & Quality for Growth in progress

that the workshop would be useful to the participants and help develop a new insight for industrial growth. Shri S. Salman Mojiz, Scientist and Coordinator of the workshop, introduced the chief guest and the experts to the audience.

Later, Shri Mojiz also proposed a vote of thanks. He specifically acknowledged the support and cooperation of Dr Sahijpal Singh, Head of the Mechanical Engineering Department, Guru Nanak Dev Engineering College, Ludhiana.

The exhibition displayed the state of the art products pertaining to metrology. Exhibitors included M/s Mitutoyo Ltd, New Delhi; M/s Kudale Instruments Pvt. Ltd, Pune; M/s EUC Tech, Chennai; and M/s Eastman Cast and Forge, and M/s Misra Boilers from Ludhiana.



CIM – Utsav 2007

The Central Institute of Medicinal & Aromatic Plants (CIMAP), Lucknow, in an effort to strengthen the linkage between farmers and industry, organized a *Kisan Mela* on 31 January 2007. About 2000 farmers from seven states participated in the *Mela*. This was the fifth consecutive year when CIMAP organized the farmer's fair to popularize its research achievements among farmers and create an interface with them. An important feature of the event was the transfer of CIMAP technology for three products, viz. mosquito repellent spray, cream and herbal

hand disinfectant to Vitromad Healthcare, a Jaipur-based company.

Speaking at the inauguration of the event, CIMAP Director Dr S.P.S. Khanuja said, "Varieties like geranium and Artemisia have bridged the gap between agriculture and trade. There has to be a qualitative chain that transports the land yield to market and trade".



Dr S.P. S. Khanuja, Director, CIMAP, delivering his welcome address during CIM-Utsav 2007

Release of a small crop calendar in the shape of a booklet that is actually a ready reckoner was the special attraction of this year's fair.

It is a timetable giving information regarding cropping patterns of 20 crops that include 10 medicinal and 10 aromatic plants. Other dignitaries present on the occasion included Dr P.K. Seth, CEO, Biotech Park, Lucknow, and entrepreneurs Ramakant Harlalka and Shailendra Jain. Later,



A view of the audience



Launching of Khus Bio-village during CIM-Utsav 2007



Exchange of MoU documents with Vitromad Healthcare



Women being trained in Agarbatti making under 'Sakshma' training programme



while interacting with farmers, Dr Seth said that CIMAP is working as a single window for farmers by providing them certified seeds and marketing their products.

Talking about the versatility of *Khus*, Ramakant Hartalka from Nishant Aroma, Mumbai, said that not only the plant is a source of essential oil widely used in high quality perfumes, cosmetics, chewing gum, tobacco and soft drinks but also very useful in controlling soil erosion. Shailendra Jain of Shaivi Industries, Lucknow, advocated for enhancing testing facilities for quality and content of agricultural produce in Lucknow.

The farmers went around the institute and saw posters and plants exhibited on this occasion. Detailed information about the new varieties and facility of booking planting materials and their delivery was also available at various stalls. Farmers purchased herbal products and publications from CIMAP. Other activities included the identification of medicinal plants and plant health competitions and providing training to women for making aromatic *agarbattis*. Scientists attended to various queries related to cultivation, marketing, distillation, etc.

Thirty-five women from various villages were trained in *agarbatti* making under 'Sakshma' training programme. This would make them self-reliant as they would be able to start their own business. There is a considerable demand for these eco-friendly *agarbattis*, which can be made

using the waste material of crops. Apart from providing information on medicinal and aromatic plants, also demonstrated were: preparation of rose-water using a specially designed device, test for the content of essential oils through Clevenger apparatus and techniques of soil and irrigation water testing.

The occasion also witnessed the launching of a *Khus* bio-village and release of a new variety of Kewanch, 'CIM-AJAR'. Kewanch (*Mucuna pruriens*) is a tropical legume of the family Fabaceae. It is remarkable for its L-dopa content, which helps maintain healthy cholesterol and blood sugar levels. Its seed powder has long been used in Ayurvedic and other traditional Indian medicine for treatment of many diseases including Parkinson's disease. In agriculture, it is useful as a cover crop in tropical areas and is also a food crop in many parts of the country. The new variety 'CIM-AJAR' developed by CIMAP has trichome (lint) free-pods with consistent high seed yield and L-dopa content coupled with early maturing traits. The average seed yield and L-dopa content under field trials were 20 quintals per hectare and six percent, respectively. This variety has been developed by CIMAP through intensive breeding efforts. The variety would find direct utility in herbal preparations and nutraceuticals in addition to its medicinal value and also as a source of L-dopa for industrial cultivation.

MERADO celebrates Golden Jubilee Year of CMERI

The Mechanical Engineering Research & Development Organization (MERADO), Ludhiana, an extension centre of Central Mechanical Engineering Research Institute (CMERI), Durgapur, celebrated golden-jubilee year of CMERI on 26 February 2007.

CMERI has contributed to the nation in a significant way by releasing the three prominent technologies among the others. The institute designed and developed 'Swaraj' the first indigenous tractor, which successfully came into commercial production. Then, it designed and released the technology of 'Sonalika', the 35 hp tractor to M/s International Tractor Ltd, Hoshiarpur, in the year 2003. The team of CMERI and MERADO scientists received CSIR technology award for the same. This technology has been in commercial production by ITL since then. Then again, during last year, technology for a small 10 hp tractor, 'Krishi Shakti' was released to a Chennai based company. Surely such technologies have tremendous relevance for an agriculture oriented country like India.

Dr R.T. Patil, Director, CIPHET, Ludhiana, was the chief guest at the Golden Jubilee function. He lauded the CMERI and MERADO by citing numerous technologies developed by them,



which have benefited the farmers at grass root level.

Prof. S.R. Verma, former Dean, Faculty of Agricultural Engineering, PAU, Ludhiana, gave valuable suggestions for the proposed Bio-fuels programme by MERADO. He also emphasized the need of reviewing the present status of bio-fuels globally and nationally and stressed on publishing this work.

On this occasion, MERADO Scientists Dr K. Kundu and Dr Pradeep Rajan gave presentations on the future proposed projects in the field of bio-fuels and those related to post-harvest engineering, respectively. Shri Ashwani Kumar presented paper on Excellence in the area of manufacturing technologies at MERADO.

Cdr. V.R. Dahake, Scientist Incharge, MERADO, welcomed the esteemed gathering and introduced the chief guest, Dr R.T. Patil, and Cdr. Daljit Singh Bawa, an expert

in fuels cell from Canada, who shared his experiences with the distinguished gathering.

Shri. S. Salman Mojiz, Head, Business Development Group, gave vote of thanks and emphasized the need of synergizing the efforts and closer interaction amongst R&D, academic institutes and industry to face the challenges imposed by globalization and liberalization and spoke about the contributions of the CMERI family in this direction.

The Golden Jubilee celebration was also graced by the presence of Prof. (Ms.) H.K. Grewal, Principal, GNE College, Ludhiana, Shri R.C. Chopra, Director, SISI, Ludhiana, Shri A.P. Sharma, G.M., Central Tool Room, Ludhiana and the licensees of MERADO developed technologies, Shri Amrinder Singh of M/s Gobind Expeller Co., Shri Gurpreet Singh of M/s Guru Teg Engg. Co., Ludhiana and Ar. H.S. Sehgal of Ludhiana.

NCL celebrates National Science Day

At National Chemical Laboratory (NCL), Pune, the National Science Day (NSD) celebration started on 22 February 2007 with NCL research students displaying their work through posters. About 150 posters in the field of biochemical sciences, catalysis, chemical engineering science, organic chemistry, physical and materials chemistry and polymer science and engineering were displayed. In the main National Science Day function held on 28 February 2007, Prof. D. Balasubramanian, Research Director, L.V. Prasad Eye Institute, Hyderabad, delivered the National Science Day Lecture on 'Translational Biology in India: from Smallpox to Stem Cell'

Prof. Balasubramanian in his talk reviewed the developments in the area of translational biology in India over the last six decades including the success stories of smallpox vaccination, the national malaria eradication programme (NMEP), green revolution, introduction of soybean, managing and preventing health problems associated with malnutrition, growth of Indian drugs and pharmaceutical industry subsequent to the Indian Patents Act (1970) that recognised only process patents, operation flood and manufacture of vaccine. Most of these achievements were



Dr R. T. Patil, Director, CIPHET, Ludhiana, delivering his address (above); and a view of audience (right)





Prof. D. Balasubramanian, Research Director, L.V. Prasad Eye Institute, Hyderabad, delivering the National Science Day Lecture



Dr S. Sivaram, Director, NCL, introducing Prof. Balasubramanian

accomplished through sustained social campaigns and community involvement. He highlighted the role of operational research in support of scientific research to achieve these goals. He informed that India today meets 45% of world's vaccine requirement. He further said that there are fifteen million blind people in India of which ten million are suffering from cataract related diseases that can be corrected through surgical treatments. He also spoke about the research being carried out at L.V. Prasad Eye Institute on various eye related ailments like optic neuropathy factor, prevention of certain forms of glaucoma, limbal stem cell deficiency, etc. Elaborating further on limbal stem

cell deficiency, he said, "At L.V. Prasad Eye Institute, we initiated this technique and restored the eye sight of a few hundred patients".

Dr S. Sivaram, Director, NCL, in his welcome remarks briefly mentioned the National Science Day activities at NCL and introduced Prof Balasubramanian to the audience.

Earlier on that day, Dr V.K. Jayaraman and Dr C.S. Gopinath, scientist of the year awardees sponsored by Maneckji & Shirinbai Neterwala Endowment Fund and Dr R.A. Mashelkar Endowment Fund, respectively, of the NCL Research Foundation, delivered the award lectures. Besides, the student awardees of Keerti Sangoram Memorial Endowment Award for Research Students and Dr Rajappa Prize for the research paper in organic chemistry also displayed their work through posters.

Prof. Balasubramanian gave away the prizes to the above awardees and also the best poster awards to the twelve students, two from each subject area who had displayed their work earlier on 22 February 2007. The Student Academic Committee (SAC) of NCL conducted the National Science Day event and Dr C.G. Suresh, Member, SAC, proposed the vote of thanks.

CPYLS at NCL

The National Chemical Laboratory (NCL), Pune, organized the CSIR Programme on Youth for Leadership in Science (CPYLS) on 27-28 December 2006. NCL, being an implementing laboratory for this CSIR HRD programme, has been organizing a two-day counseling session for class X meritorious students from Maharashtra State every year since 1999. NCL invites 150 meritorious students who have topped class X examination from Maharashtra State Boards, CBSE and ICSE accompanied by either their parent or teacher. The students from Nagpur and Amravati Boards attend the counseling session at National Environmental and Engineering Research Institute (NEERI), Nagpur, and the students from remaining six State Boards attend the counseling at NCL. This year, 250 participants comprising students and accompanying teachers attended the counseling session at NCL.

Prof. Arvind Kumar, Director, Homi Bhabha Centre for Science Education, Mumbai, was the chief guest and gave the keynote address on "Career opportunities for youths: Leadership in science and research". He said that there are exaggerated views on the professional courses like engineering, medical, computer science as career options among parents, teachers and society compared to Science as career. He elaborated on India's achievements in various areas such as agricultural production, industrialization space science, nuclear power, etc. He also spoke on large set-up available for research and development and education in the country.



Dr S. Sivaram addressing the CPYLS participants



Prof. Arvind Kumar delivering keynote address during the student counseling session

Prof. Kumar said that Indian students are comparable to the best in the world as is evident from the achievements in International Olympiads and performance in graduate schools in USA and elsewhere. Prof. Arvind Kumar explained how the knowledge from various disciplines of sciences helps to understand the phenomena in nature and put forward potential opportunities in leading the science and research unlike other fields of engineering, IT and BT. He also listed the career opportunities available in science and said that career in science is satisfactory as compared to stressful jobs in IT sector. For motivation towards science he advised the students to interact with the scientists and read history of science including the biographies of great scientists.

Dr S. Sivaram, Director, NCL, in his welcome remarks said that career in science is as exciting as any other professional field. India is receiving tremendous attention from around the world because of its asset of young population. If we create right opportunities for this young population for the next two-three decades we will define the future of not only India but also of the world. Earlier we used to look

towards western countries for solution in S&T but now we would be in a position to provide such solutions to other countries because our young generation has the potential to make India a powerhouse of S&T knowledge. "Because of availability of trained and suitable manpower, many of the renowned multinational companies around the world are opening their R&D centers in India," he added.

Shri S.B. Katte, Programme Coordinator, introduced CPYLS programme highlighting its objective and scope. Senior scientists of NCL delivered lectures on career opportunities in various disciplines of sciences and importance of research as a career and covered the topics such as chemistry, materials science, plant tissue culture, biotechnology, polymer science and engineering, chemical engineering, physical and chemical sciences. Visit to chemical engineering and process development, combi-chem-bio resource centre, catalyst pilot plant, centre for materials characterization, tissue culture pilot plant, and polymer laboratories and facilities was also arranged.

In the concluding session, Dr Sourav Pal, Head, Physical

and Materials Chemistry Division of NCL, chaired the panel discussion. In his valedictory speech, Dr Pal emphasized on building scientific temper in life. He encouraged students to take up science as a discipline of choice and highlighted the challenging and innovative options in science career. He spoke on how science has shaped our every day life and emphasized the need for inter-disciplinary thinking in science. Students interacted with scientists on numerous topics of interest. Prof. K.N. Ganesh, Director, Indian Institute of Science Education and Research (IISER), Pune, briefed on IISER's Graduate and Post-Graduate level education programmes.

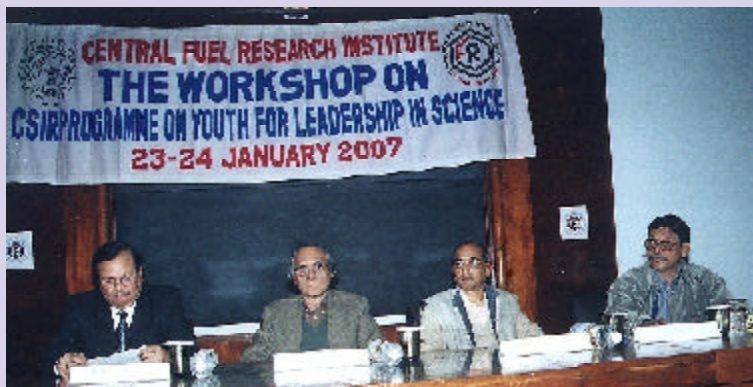
Two students from the participants, namely Ms Monika Mallinath Mashalkar of SSC Board, Latur and Ms Nisha Kailasrao Lagad of SSC Board, Aurangabad were selected on the basis of their marks in X standard. These students can visit any CSIR laboratory of their choice. Other students, who pursue science after class X, would be provided support and facilities to do their project work for class XI and XII at one of the CSIR laboratories. They will be encouraged to take up projects of their choice.



Students with parents and teachers attending the CPYLS programme



CPYLS Programme at CFRI



The inaugural session of CPYLS at CFRI, in progress

The Central Fuel Research Institute (CFRI), Dhanbad, organized the CSIR Programme on Youth for Leadership in Science (CPYLS) during 23-24 January 2007. Prof. Dipankar Chakroborty, former Director, Indian Association for Cultivation of Science, Kolkata, was the Chief Guest and inaugurated the two-day programme that was attended by 28 meritorious students of class X. On this occasion Prof Chakrovarty delivered a lecture on "Amazing World of Nano-Science". Dr D.D. Haldar, Scientist 'F' delivered welcome address.

Students were taken round the different departments, and shown the pilot plant and sophisticated instruments at the institute. Senior scientists delivered talks on activities of their departments and the students were given ample opportunity to interact with the scientists. There were also live interaction between students and scientists of the institute.

The programme concluded with the valedictory function where students gave their views about the programme. Certificates of participation were given away to students by the Acting Director of CFRI. Dr R. Dasgupta, Head, HRD & IMD, praised the students and their parents for active participation in the programme. Dr Abhijit Sarkar, Scientist, coordinated the programme with active support of Shri R.N. Goswami, HOS/HRD, Shri V. K. Sahu, Shri K.P. Singh and Shri B. Manjhi of HRD Section.

NBRI organizes Rose and Gladiolus Show

The National Botanical Research Institute (NBRI), Lucknow, organized the Annual Rose and Gladiolus Show on 20-21 January 2007. The enthusiastic crowd was seen all over the show ground during the two-day event, admiring the riots of colours and spectrum of splendid rose and gladiolus flowers vying with each other for their intrinsic beauty. The show attracted this year a total of 543 entries belonging to 54 competitors from Lucknow and outstation.

The Chief Guest at the prize distribution function Prof. R.B. Singh, Member, National Commission on Farmers, New Delhi and Guest of Honour Shri Rakesh Mittal, Commissioner, Lucknow, gave away a total of 25 running cups/shields/trophies along with 246 other prizes to the winners. HAL, Lucknow bagged the maximum 6 trophies/shields/trophies and 35 prizes followed by Director, Horticulture and Food Processing Department, U.P., Lucknow.

Welcoming the guests and participants, Dr Rakesh Tuli, Director, NBRI, Lucknow, said that this year NBRI had made an effort to display some rare and endangered varieties of plants to provide an opportunity to the public in general and students in particular to learn more about the fascinating diversity existing in the plant kingdom. He hoped that farmers in and around Lucknow would make use of the various varieties and technologies developed by NBRI to a much greater extent.

Lauding the efforts of NBRI in organizing the show, Prof. Singh said that flowers not only captivate us through their colours and fragrance but also fill our hearts with peace and happiness. Expressing his concern over the rapid loss of biodiversity owing to pressure of the development process, he said that the



pace of the loss of genetic diversity is tremendous and scientists are finding it difficult to replete the biodiversity. He appreciated the efforts of NBRI in protecting the genetic resources of the nation and urged NBRI to join hands with universities and policy makers to develop programmes for the benefit of farmers, especially those involved in the floriculture industry.

Shri Mittal in his speech stressed for a well coordinated balance between nature and development and in this context advocated the need of organic cultivation and organic foods.

This year, the award for Best Rose of the Show has been given to Dr. S.P.S. Khanuja, Sugandh Vihar, Vikas Nagar, Lucknow; Best Red Rose of the Show to Director, Horticulture & Food Processing Department, Lucknow; Best Bicoloured/Blended Rose of the Show to Commercial Radiator, Lucknow; Best Fragrant Rose of the Show and Best Yellow Rose of the Show to HAL, Lucknow; Best Striped/Streaked Coloured Rose of the Show to Workshop Cantonment Council, Lucknow; and Best Pink Rose of the Show to Director CIMAP, Lucknow. Trophy for Best

Gladiolus Spike of the Show was lifted by Km. Rekha Gautam, Mehbullapur, Sitapur Road, Lucknow.

Hindustan Aeronautics Ltd, Lucknow, lifted six trophies/cups/shields and stood first in the show. These are: Ch. Akbar Hussain Memorial Running Trophy - for the Best Fragrant HT Rose of the Show, Sulabh Tewari Memorial Running Challenge Cup - for the Best HT Yellow Rose of the Show, Bonanza Decorator's Running Shield - for the highest score in the show, Motor Sales Running Challenge Cup - for the Best Collection of Eight Gladiolus Spikes of Different Varieties, H.C. Gupta Memorial Running Challenge Trophy for the Best Collection of 12 Stems of Different Floribunda Roses and Bonanza Decorator's Running Challenge Cup for the Highest Score in Potted Roses.

Director, Horticulture and Food Processing Department, U.P. Lucknow, got the second position by winning five trophies/cups/shields, namely., Commissioner's Running Challenge Cup for the highest score in Class A, Raja Bhadri Running Challenge Shield for the Best Indian

Bred HT Rose, Percy Lancaster Challenge Cup for the Best HT Red Rose of the Show, Lt. Col. V. R. Mohan Running Challenge Cup for the highest score, Sir Padampat Singhania Memorial Running Trophy for the Best Collection of 27 Specimen Blooms of Different Varieties of HT Roses.

Dr S.P.S. Khanuja, Sugandh Vihar, Vikas Nagar, Lucknow, won three trophies/cups/shields, namely, Commissioner's Running Challenge Shield for the highest score, Ch. Muzzaffaruddin Memorial Running Trophy for the highest score for the Fragrant Roses, Mall Nursery Running Challenge Cup for the Best Rose of the Show and got third position.

Besides, several other participants from different parts of Uttar Pradesh won prizes: Workshop Cantonment Council, Lucknow, won the Movie Mughals' Running Challenge Cup for the highest score and Hirday Prasad Tiwari Running Challenge Shield for the Best HT-Striped/Streaked coloured Rose of the Show. Shri P. Balakrishnan, HINDALCO Industries Pvt. Ltd, Sonabhadra, U.P. won Smt. Usha Kacker



Best bicolour rose



Best red rose

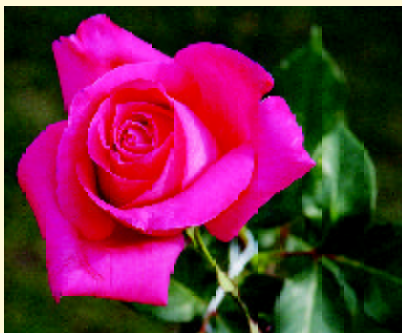


Best streaked rose



Best gladiolus spike

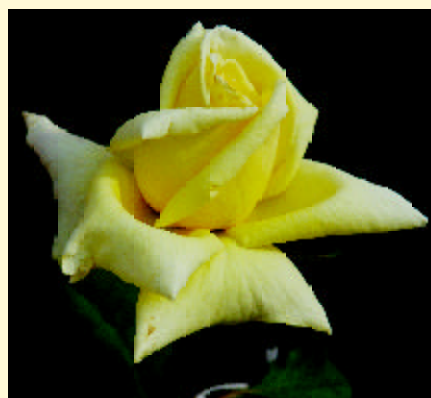
Memorial Running Challenge Cup for the Best Collection of Indian Bred Three Stems of Different Roses. Commercial Radiators, Chinhath, Lucknow, lifted the R.V. Sitholey Memorial Challenge Cup for the Best HT Bi-coloured/ Blended Rose of the show. Director, CIMAP, Lucknow, bagged Smt. Kumud Rastogi Memorial Running Challenge Trophy for the best HT Pink Rose of the Show. Kumari Ishita Singh of Viram Khand, Lucknow lifted Jugal Kishore Jewellers Running Challenge Trophy for the highest score. Chief Manager (Farm), HAL, Faizabad, Lucknow, lifted Baljit Singh Memorial Challenge Cup for the Best Floribunda Rose displayed in 25 cm earthen pot. HINDALCO Industries Pvt. Ltd, Sonabhadra, U.P. lifted the Motor Sales Running Challenge Shield for the best collection of 12 specimen blooms of different varieties of HT Roses. Kumari Rekha Gautam, Mohaballapur, Sitapur Road, Lucknow captured the Syed Gulam Abbas Kazmi Memorial Running



Best pink rose

Challenge Shield for the Best Gladiolus Spike of the show. Mirza Muktadir Beg, Barafkhana, Thakurganj, Lucknow lifted the Army Commander Challenge Cup for the best collection of 12 Gladiolus Spikes of different varieties. Vice President and Senior General Manager, Hotel Clark Awadh, Lucknow won the Hindustan Aeronautics Limited (Lucknow Division) Running Challenge Trophy for the best collection of Gladiolus Spikes in floral trade.

Under the thematic arrangements enclosure, there were a number of catchy titles displayed in artistic and imaginative way, such as 'The Taste of India'; 'Save Environment Save Us'; 'Waves of Tranquility'; 'The Midas Touch'; 'Rang Lal Hai Lal Bahadur Ka'; 'Shanti



Best yellow rose of the show



Winners of the show

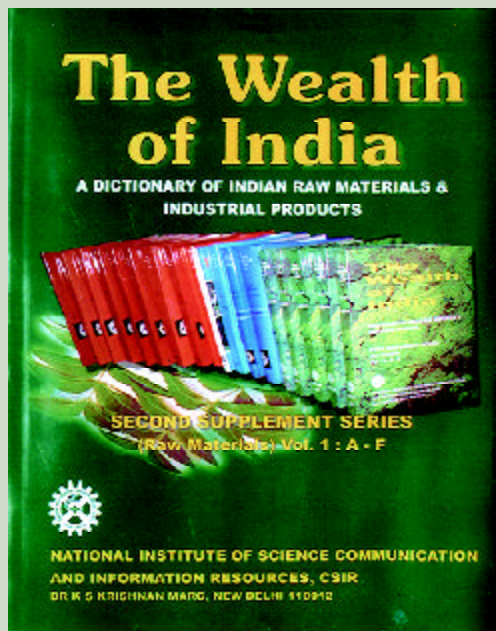
Pratik'; 'Hum Sab Ek Hain'; 'Black Lady'; 'Pink Perfect'; 'Dulhan'; 'Green Sleeve', etc.

To make the general people and students aware of the rare plant species that are fast becoming rare, endangered and threatened (RET), this year NBRI added a new enclosure on 'Novel Plant Species' showcasing about 20 such plant species. Among these, the centre of curiosity were: *Nepenthes khasiana*, a carnivorous plant and better known as Pitcher Plant which is an endangered species restricted to the state of Meghalaya in the country; Sanjeevani Booti (*Selaginella bryopteris*) – a pteridophyte plant known for its resurrection capabilities. Among the other RET plants species on display were: *Davallia bullata*, *Dischidia benghalensis*, *Eremostachys superba*, *Frerea indica*, *Helminthostachys zelanica*, *Hoya wightii*, *Isoandra villosa*, *Lepdozamia peroffskyana*, *Microsorium punctatum*, *Phoenix rupicola*, *Psilotum nudam*, *Trachycarpus takil*, *Vanilla walkeriae*, and *Zamia neurophyllidia*.



Wealth of India- Vol 1 of Second Suppl Series

The *Wealth of India - Raw Materials* is a unique unrivalled encyclopaedic publication of National Institute of Science Communication and Information Resources (NISCAIR), New Delhi, that is acclaimed world over as a standard reference



resource of information on India's raw materials of plants, animals and minerals origin. With a view to update/incorporate new information continuously, the 11 volumes and two supplements of the 'Original Series' brought out during 1948-76 were followed by three volumes and a supplement of the 'Revised Series' during 1985-92 and five volumes of the 'First Supplement Series' during 2000-04. Work is on now on the 'Second Supplement Series' and recently, first volume of this series has been brought out.

Covering alphabets 'A' to 'F', the present volume provides updated information of the seven-year period — from 1982 to 1986 and from 1995 to 1996, on 447 plant genera and 978 species. Six new genera: *Acrocephalus*, *Aeluropus*, *Catalpa*, *Cremastra*, *Cremanthodium* and *Cuphea* and 96 new species have been included. *Allium*, *Anacardium*, *Brassica*, *Elaeis*, and *Euphorbia* feature in great detail, besides several those having great potential uses in the future.

The publication assumes great importance in the present scenario where there is a growing interest in the plant-based systems of medicine.

Contact Person for WOI: Dr O.J. Chakre (011-26863701;ojc@niscair.res.in)

FICCI Award to Dr Anil Kumar

Dr Anil Kumar, Scientist, Physical and Materials Chemistry Division of National Chemical Laboratory (NCL), Pune, has been awarded FICCI Award 2005-06 in the category "Outstanding Contribution to



Knowledge Based Industries". The award, carrying a cash prize of Rs 1 lakh with a citation and a plaque, was presented to Dr Kumar by Prime Minister Dr Manmohan Singh during the annual general meeting (AGM) of Federation of Indian Chambers of Commerce and Industry (FICCI) at New Delhi.

Dr Kumar has employed the fundamental principles of thermodynamics and chemical reaction kinetics to delineate the forces that are responsible for the rate enhancement of organic reactions. He proposed that internal pressure of solvent media in conjunction with activation volumes of the reactions can explain both rate enhancement and retardation. As this concept can point out to the main forces driving these reactions, it is possible for the users to employ the method to predict which reactions will go fast and which will not. This methodology can be applied to select solvent systems that will maximize the reaction products in least possible reaction time. In addition, the reactions that are otherwise high pressure-driven reactions can now be realized with high yields in solvent media recommended by this method. Several reactions were successfully attempted by Dr Kumar in his search for generalizing this methodology. With the use of this method, it is now possible that many sluggish, but industrially important reactions can be accelerated to give the products with high yields.



Dr G. Parthasarathy and Dr Ahmed Kamal awarded APSA 2007

Dr G. Parthasarathy, Scientist F, Geological Studies Division, National Geophysical Research Institute (NGRI), Hyderabad, and Dr Ahmed Kamal, Scientist F, Organic Chemistry-I Division, Indian Institute of Chemical Technology (IICT), Hyderabad, have been awarded the Andhra Pradesh Scientist Award for the year 2007 (APSA-2007), in the area of Physical Sciences and Pharmaceutical Sciences, respectively. These Andhra Pradesh State Council of Science and Technology's awards were presented on the National Science Day (28 February 2007) by the Vice Chancellor of Osmania University, in Hyderabad.

Dr Parthasarathy has done significant work in the field of experimental mineralogy and mineral physics during the past 27 years. After his Ph.D. from Department of Physics, Indian Institute of Science, Bangaluru, he visited Germany as Alexander-Von-Humboldt Fellow; and Cornell University, USA, as a visiting faculty. He has been working at NGRI since 1990. He has published 138 papers in peer-reviewed SCI journals, and presented 130 papers in national and international conferences. He has filed five international and national patents and two of these have been accepted by PCT and European



Dr Ahmed Kamal receiving the Andhra Pradesh Scientist Award from Prof. Mohd. Sulemann Siddiqi, Vice Chancellor, Osmania University.



Dr G. Parthasarathy receiving the Andhra Pradesh Scientist Award from Prof. Mohd. Sulemann Siddiqi, Vice Chancellor, Osmania University.

Patent Office. Presently, he is working on High-Pressure Phase Stability of Titanium-based Minerals, and High-Pressure Mineralogy of Meteorites, relevant to Lunar Mineralogy under Planetary Exploration Program of ISRO.

Dr Kamal obtained his doctorate degree in 1982 and worked as a postdoctoral fellow at the

University of Portsmouth, U.K. Since 1983, he has been working as a scientist at IICT. Dr Kamal has successfully carried out extensive basic and applied research in the design and synthesis of pharmaceutically important compounds. His research contributions are on the development of new molecules that would be useful for the treatment of cancer. Some of the molecules designed by him are in preclinical stages for cancer chemotherapy. Dr Kamal's research work has consistently endeavored to take organic synthesis close to that practiced by nature mainly by exploring naturally available reagent equivalents (enzymes) to the chemical ones, thus making the chemical technologies greener and environment-friendly. Both these research aspects are of great societal benefit and relevance.

He has been chairman and member of several committees, including the Management Committee of the institute and is an elected Fellow of the Indian Academy of Sciences. He has contributed extensively to the human resource development. About 30 students have obtained their Ph.D. degrees and several M.Sc./M.Tech. dissertations have been carried out under his guidance. He has published more than 170 scientific articles and filed over 40 patents.



CRR I TRAINING PROGRAMMES FOR THE YEAR 2007-2008

TITLE OF THE COURSE	DURATION WITH DATES	COURSE FEE	COURSE COORDINATOR
A. PAVEMENT ENGINEERING & MATERIALS			
• Rigid Pavements and Paver Blocks : Design, Construction & Quality Control Aspects	10-14 Sept., 2007 (5 days)	Rs. 6000/-	Sh. Satander Kumar
• Design, Construction and Maintenance of Flexible Pavements	6-10 Aug., 2007 (5 days)	Rs. 6000/-	Dr. Sunil Bose
• Pavement Evaluation Techniques and their applications for Maintenance & Rehabilitation	19-23 Nov., 2007 (5 days)	Rs. 6000/-	Sh. B.M. Sharma
B. ROAD DEVELOPMENT PLANNING & MANAGEMENT			
• GIS Application in Planning and Management of Road Network	21- 25 Jan. 2008 (5 days)	Rs. 6000/-	Dr. B. K. Durai
• International Course on Dissemination of HDM-4	8-19 Oct. 2007 (10 days)	Rs. 25,000/-	Dr. P. K. Kanchan/ Dr. D. Mukhopadhyay
C. GEOTECHNICAL ENGINEERING			
• Geotechnical and Landslide Investigations for Highway Projects	3-7 Dec., 2007 (5 days)	Rs. 6000/-	Sh. Sudhir Mathur
D. BRIDGES & STRUCTURES			
• Bridge Diagnostics, Performance Evaluation and Rehabilitation	9-13 July 2007 (5 days)	Rs. 6000/-	Dr. Ram Kumar
E. TRAFFIC & TRANSPORTATION PLANNING			
• Traffic Management and Safety	June 25-29, 2007 (5 days)	Rs. 6000/-	Dr. S. Gangopadhyay
• Aspects of Transportation Planning and Environmental Impact Assessment Studies for Roads	Feb. 11-15, 2008 (5 days)	Rs. 6000/-	Dr. S. Gangopadhyay

Customized Tailormade Programmes:

In addition to the above, CRR I also organises customized tailor made programmes as per the clients requirements.

Course Fee: The course fee as indicated above is payable in advance by crossed bank draft in favour of 'Central Road Research Institute, New Delhi'.

FOR FURTHER INFORMATION & SENDING NOMINATION CONTACT:

Shri T.K.Amla,

Course Organiser & Head

Information, Liaison & Training, Central Road Research Institute,

P.O.CRR I, Delhi-Mathura Road, New Delhi – 110 020

Phone: 91-11-26921939; Fax: 91-11-26845943, 26830480; Telefax: 91-11-26921939

E-mail: tkamla.crri@nic.in, mkmeena.crri@nic.in

Printed and Published by S.K. Rastogi on behalf of National Institute of Science Communication and Information Resources (CSIR),

Dr K.S. Krishnan Marg, New Delhi -110 012 and printed at NISCAIR Press, Dr K.S. Krishnan Marg, New Delhi -110 012

Editor: Dr B.C.Kashyap; Associate Editors: Meenakshi; Vineeta Singhal; Editorial Assistant: Neelima Handoo;

Design: Pradip Banerjee; Sarla Dutta; Production: Kaushal Kishore

Phone: 25846301 Fax: 25847062 E-mail: bck@niscair.res.in; meenakshi@niscair.res.in; vineeta@niscair.res.in; Website: http://www.niscair.res.in

For subscription: The Sales & Distribution Officer, NISCAIR; E-mail: sales@niscair.res.in Annual Subscription: Rs 300 Single Copy: Rs 15.00

Subscription Complaint No 25843359