ISSN 0409-7467

CSIR NEWS

VOL 56 NO 14 30 JULY 2006

NIO tests performance of Autonomous Underwater Vehicle 'Maya'

A small Autonomous Underwater Vehicle (AUV) - *Maya* developed by the National Institute of Oceanography (NIO), Goa, which is fitted with sensors for oxygen, chlorophyll, conductivity, turbidity, temperature and depth, recently performed two test missions in the Idukki Dam in Kerala. In the first mission the vehicle was programmed to dive to different depths in a staircase pattern up to 21m, and in the second mission, at 1m-depth up to 4 kilometers of continuous operation. She successfully collected data in both the missions.

This significant project for developing the small AUV at NIO was undertaken by a team of scientists comprising Dr Elgar Desa, R. Madhan, Shivanand Prabhudesai, Pramod Maurya, Gajanan Navelkar, Sanjeev Afzulpurkar, A. Mascarenhas, R.G. Prabhu Desai, S.N. Bandodkar and a group of young Project Assistants. The project is funded by the Department of Information Technology in the Ministry of Communications and Information Technology.

Autonomous Underwater Vehicles (AUVs) are essentially robot platforms that can be used to collect data and imageries in the ocean, lakes, estuaries, rivers, and dams. AUVs are novel machines that can be programmed to dive and maintain control at any given depth layer in a water body, to change course, to follow seabed terrain, to avoid obstacles and when a mission is accomplished, to return 'home'.

A view of the Autonomous Underwater Vehicle (AUV) - *Maya* developed by the National Institute of Oceanography (NIO), Goa.

MAYA AUV cruising underwater

MAYA AUV cruising on surface

A single underwater motor is used to propel *Maya*. Two stern planes and a single rudder control diving and heading maneuver respectively. The nose section on *Maya* is removable and different sensors can be fitted onto it for specific mission at sea. This AUV is designed to receive commands from shore and also send data over high-speed radio link. Underwater navigation uses the Doppler Velocity Log (DVL) and a dead reckoning algorithm that estimates position below surface. Surface navigation is based on GPS.

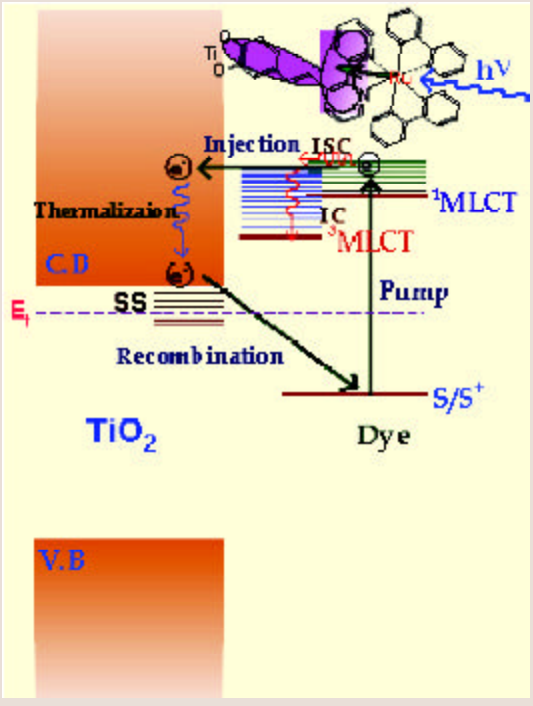
The *Maya* AUV has many applications in oceanography. It can collect standard oceanographic data in confined areas; carry out shallow water bathymetry using acoustic methods; detect blooms with the help of optical radiometers; and also work as a test platform for new sensor technologies. *Maya* is scheduled next for test operations in the coastal waters of India.

Strongly Coupled Ruthenium-polypyridyl Complexes for Efficient Electron Injection in Dye-Sensitized Semiconductor Nanoparticles

MULTI-exponentiality of electron injection kinetics from Ru(II)-polypyridyl complexes anchored to TiO_2 semiconductor nanoparticles is a debatable issue due to the overlap singlet/triplet manifold in the excited states of adsorbates.

G. Ramakrishna, D. A. Jose, D. K. Kumar, A. Das, D. K. Palit and H. N. Ghosh of the Central Salt and Marine Chemicals Research Institute (CSMCRI), Bhavnagar, have published an overview of strongly coupled ruthenium-polypyridyl complexs for efficient electron injection in dye-sensitized semiconductor nanoparticles in *Journal of Physical Chemistry B*, **109** (2005)15445-15453.

The tailor-made [{bis-(2,2'-bpy)-(4-[2-(4'-Methyl-[2,2']-bipyridinyl-4-yl)-vinyl](benzene-1,2-diol)} ruthenium(II) hexafluorophosphate] (Ru-cat) is found to be coupled strongly with the TiO_2 nanoparticles through its pendant catechol moiety. A single exponential and pulse-width limited (< 50 fs) electron injection has been observed and dynamics of the electron transfer process monitored by Femto-second transient absorption spectrometer. Electron injection kinetics has been determined by directly monitoring the appearance signal of injected electron in the nanoparticles in the visible and near-IR region. Researchers' results indicate that electron injection take place predominantly from non-thermalized singlet state (^{1}MLCT), and/or non-thermalized triplet state (^{3}MLCT) or a combination of both, which is a unique observation in ET dynamics in Ru-polypyridyl/TiO_2 systems studied so far. Strong coupling in dye-nanoparticle system facilitates ultrafast single exponential electron injection, which competes with thermalization process of the excited states.



National Institute of Oceanography, Goa

R & D Highlights

A tsunami struck the coast of India after a gap of almost 60 years and reminded the country of the hazards of living in coastal areas. The event posed a challenge to researchers of the National Institute of Oceanography (NIO), Goa. The institute responded by two-pronged effort. First, undertaking research that would help the country put together an effective warning system. Second, and more important, leading a national research programme to enhance coastal hazard preparedness. The tsunami and the subsequent response was an impromptu activity during the last quarter of the year. The recently brought out NIO annual report summarizes what all happened during 2004-05. It is divided into the following sections: research and development; events; awareness programme; and human resource development.

Highlights of R & D activities

Oceans & Climate

Understanding the ocean-atmosphere interactions with particular reference to monsoon is important as the summer monsoon processes have a bearing on the Indian economy. The focus this year, ranged from identifying breaks in monsoon rainfall of current times to climate variability in the past. The ocean circulation as a driving force of the surface ocean productivity in different seasons was shown. Among the new methods, the Outgoing Longwave Radiation (OLR) was found to be a very useful tool to estimate the sea surface salinity.

Biogeochemistry & Ecosystem

The research groups recovered culturable bacteria from the deep sediments of the Chagos Trench in the Indian Ocean that remained dormant for times ranging from few thousands to several million years. Such microbes could tell us stories of life and environment in the distant past. The research also focused on anthropogenic influence to findings of harmful algal blooms in coastal ecosystems. On microscales, the irradiance, rather than tidal influence, was found to regulate diatoms migration in intertidal sediments. Significantly higher transport of terrigenous matter to the Indus Fan was inferred to have occurred during 290-360 kyr due to massive turbidity flows.

Microbial Bioremediation & Metabolites

The institute has been pursing research on anti-microbial and a variety of environmental strains of microorganisms that have potential to detoxify many hazardous pollutants. Many newer molecules (e.g. g-pyrone propionates, peridininol) and enzymes (xylanase) have been identified. These molecules have been found to have potential in human health care applications. These findings have been made possible from the extensive ecological studies the institute has been carrying out. Searches for new molecules, the derivation of sunscreen compounds and anti-spasmodic carotenoid pigment are of significance from pharmacological point of view. Studies on bioremediation of environmental pollution using marine microbial strains and their metabolites and enzymes have also shown greater promise in mitigating pollution problems.

Coastal Environment & Pollution

Changes in coastal ecological systems influence the health of the humans as well as the economy. These changes could be due to natural processes such as tidal fluctuations in the Gulf of Katchchh, sediment discharge by Ayerwady river in Andaman Sea and Gulf of Martaban, and a 10°C variation in temperature between summer and winter in the Hooghly estuary that could seriously affect the coastal ecological processes. On the other hand, the anthropogenic interference due to establishment of refineries along north-western Indian coast have been found to result in an increase in the petroleum hydrocarbon concentrations, which affect marine life adversely. A significant reduction in total biomass in the dredging areas of Cochin harbour was found. It is high time to realize the necessity to balance human

activities with natural processes, so as to maintain simultaneous sustainable development and environment, the studies show.

Non-living Resources

High-resolution geophysical investigations in the Andaman Sea, which is one of the poorly understood marginal seas, revealed the backarc basin to be much younger than previously believed. Its true seafloor spreading is found to have commenced only about 4 Ma instead of 11 Ma suggest earlier. The results further suggest westward propagation of this spreading center in the recent geological past. In the Central Indian Ocean Basin, satellite gravity, seismic reflection studies together with bathymetry have been used to infer the plate boundary forces acting on the deformation zone. While manganese nodules in the Central Indian Basin continue to attract attention for their potential of precious metals, NIO's recent investigations on the ferromanganese crusts from Afanasiy-Nikitin seamount suggest a significant cobalt enrichment. Studies have also shown that clay contents in a sediment plume, generated by a deep sea seafloor sediment disturbance, can be used as a tracer of the plume migration.

Engineering & Technology

Wave characteristics during rough sea states are essential for the appropriate design and construction of coastal structures. Shallow water directional wave information is also important for beach nourishment, port development and navigational studies. Studies covering these aspects formed part of research in this year. A new software was developed in the institute under the Oceansat 1 (IRS-P4) validation programme that showed encouraging results. This software has several modules such as importing text data to the database, online subsetting, collecting synchronized satellite-seatruth data match up in various user defined space-time windows, statistical analysis, graphical representation and predicting corrected satellite data using best statistical fit.

Marine Archaeology

The possibility that several temples had submerged in the sea off Mahabalipuram was taken up for examination. Stone anchors, considered as proxies of earlier maritime activity, and Dwarka, an ancient harbour, were the foci of study. While the explorations off Goa continued, that of Porbunder have been also initiated to study its maritime legacy.

Patents

During the year, 15 and 21 patent applications were filed in India and abroad respectively. Three patents were granted in India and 11 abroad (10 in USA and one in UK). These patents are in diverse fields such as pharmacology (malaria, osteoporosis), antifouling, fluorescent dyes of biotechnological applications, marine instrumentation, etc.

MoUs

Following are the organizations with whom MoUs were signed during the year with the area of cooperation and duration: Regional Research Laboratory, Thiruvananthapuram [Application software]; Padre Conceicao College of Engineering, Goa [Academic training and research in IT, electronics and allied areas]; Andaman Lakshadweep Harbour Works, Kavaratti [Monitoring the changes in corals and associated biodiversity]; Indomer Hydraulics (P) Limited, Chennai [Oceanographic services, consultancy and logistics]; Goa Engineering College, Goa [Academic training and research in IT, electronics and allied areas], Agharkar Research Institute, Mumbai [Development of drugs from marine organisms for organogenesis and angiogenesis]; Shreya Life Sciences Private Limited, Mumbai [Collaboration for anti-TB drug development]; Institute of PetroSafety, Health and Environmental Management (ONGC), Goa [EIA studies in the offshore locations]; Gas Authority of India Limited (GAIL), New Delhi [Exploration surveys for gas hydrates].

Technology Transfer

Two new anti-malarial compounds released for commercialization

The Council of Scientific & Industrial Research (CSIR – the parent body of the National Institute of Oceanography, Goa) entered into licensing agreement with Shreya Life Sciences, Mumbai, for commercialization of two new anti-malarial compounds. Scientists of NIO in association with the

International Centre for Genetic Engineering and Biotechnology, New Delhi and National Centre for Cell Science, Pune, discovered the two lead anti-malarial compounds from an Indian marine mussel. These compounds display biological activity against different malarial parasites including *P. falciparum* and are proven non-lethal to host cell. One of the compounds is also active against chloroquine-resistant strain. Scientists working on this project claim that these compounds will prove most suitable candidate drugs for malaria in future. Under this project the scientists are also developing other lead compounds for various human and plant diseases like Osteoporosis, Tuberculosis, HIV and plant viruses.

Awards/Recognition

The institute received acclaims for its demonstrated unparalleled scientific excellence. Dr M. Shyam Prasad received National Mineral Award for the year 2003; Drs B. Chakraborty and V.N. Kodagali received CSIR Technology Award for the year 2004. Dr V. Purnachandra Rao was awarded the Raman Research Fellowship, 2005-06 and Dr M. Dileep Kumar was elected Fellow of the Indian Science Academy (INSA). The honour of Vigyan Ratna for the year 2003-2004 was given to Dr S.W.A. Naqvi.

NBRI organizes National Conference on Bougainvillea

Dr Rakesh Tuli, Director, NBRI delivering his inaugural address at National Conference on Bougainvillea. Seated on dais (from left) are: Dr R.K. Roy, Dr V.K. Verma and Dr A.P. Singh

THE National Botanical Research Institute (NBRI), Lucknow, organized a National Conference on Bougainvillea in collaboration with Bougainvillea Society of India, New Delhi. The conference was sponsored by CSIR.The main purpose of the conference was to bring researchers, growers and nurserymen on one platform to discuss present status of R & D work on Bougianvillea and future strategies for the exploitation of its use in horticultural trade. Over 50 delegates from many leading research institutes and organizations of the country participated in this conference. Dr V.K.Verma, Dy. Director General (Horticulture), CPWD, New Delhi, was the Chief Guest and Dr Rakesh Tuli, Director, NBRI, presided over the inaugural function.

Dr Rakesh Tuli, in his welcome address spoke about the challenges and scope of pursuing Bougainvillea for basic and applied research. He highlighted the contribution of NBRI to Bougainvillea research by way of development of new cultivars/ varieties and provided guidelines for future research work on Bougainvillea. He pointed out that being a highly adaptable plant with respect to abiotic stresses and disease susceptibility and its ability to grow as climber, shrub or even a tree; there is a lot to learn from the growth and biology of this ornamentally important plant species. He was of the view that besides its ornamental value, a lot of research has to be done on

Left: Dr A.K. Goel, Scientist, NBRI showing the germplasm collection of Bougainvillea at NBRI to one of the delegates
Right: A view of the Bougainvillea at NBRI garden

understanding the molecular basis of these aspects. He also outlined some of the important challenges in the improvement of Bougainvillea as an ornamental plant, like increasing the number of whorls, introducing new colours, development of cultivars with blue bract colour and possibly, scent.

Dr V.K. Verma in his address mentioned about the huge popularity of Bougainvillea throughout India and its multifarious uses in gardening. He eulogized the efforts of NBRI as well as several research institutes in the field of developing new cultivars and varieties and maintaining the germplasm of Bougainvillea. Some of the best outcomes have come from the Indian Institute of Horticultural Research, Bangalore; Indian Agricultural Research Institute, New Delhi and National Botanical Research Institute, Lucknow. He suggested that research work on Bougainvillea needs to be focused on developing new varieties using cross pollination and hybridization. For promoting interest in Bougainvillea, he called upon the delegates and city planners for the need to establish Bougainvillea gardens in various parts of the country

Dr A.P Singh, Secretary, Bougainvillea Society of India, New Delhi and Head, Division of Floriculture and Landscaping, IARI, New Delhi, in his keynote address outlined the history of Bogainvillea research in India and the origin of the different species and cultivars of Bougainvillea in India and abroad. He also highlighted the different breeding methods employed for the development of new cultivars. The contributions made by eminent breeders like S. Percy Lancaster, Dr B. P. Pal and some nurserymen were specially mentioned. Dr Singh suggested that IARI, NBRI, IIHR and Lal Bagh Garden should be developed as germplasm centers of Bougainvillea.

During the two days' deliberation, the experts put their views on germplasm collections, agro-technology, characterization, improvement and landscape use.

In the first technical session, Dr S.K.Datta, Head, Floriculture Section, NBRI, gave a talk entitled 'Multidisciplinary research activities on Bougainvillea'. Dr R. Jayanti, University of Agricultural Science, Bangalore, delivered his lecture on 'Morphology and bio-chemical characterization of different varieties of Bougainvillea'. Another lead lecture on 'Origin, evolution and improvement of garden Bougainvillea' was given by Dr D. Ohri, NBRI, while Dr B.K. Banerji delivered his lecture on 'Mutational Studies in Multi-bracted Bougainvillea'. Studies on varietal behaviour of Bougainvillea and its horto-taxonomical aspect were highlighted through lectures delivered by Dr P. Pandey, DG, PG College, Kanpur and Dr A. K. Goel, NBRI, respectively. Dr M. M. Jana, NCL, Pune and Dr S.S. Sindhu, IARI, New Delhi, presented their papers on 'Landscapes use of Bougainvilleas'. Another interesting lecture on 'Use of RAPD analysis for determining genetic diversity and relationship among Bougainvillea

cultivars' was given by Dr S.K. Datta.

'Medicinal use of Bougainvillea' was reported for the first time in the conference, opening a new research line. The paper entitled 'D-Cap – An infallible drug for diabetes prepared from Bougainvillea leaves' presented by Dr V. P. Singh of Deen Dayal Research Institute, Chitrakoot, MP, created lot of interest among the delegates. In addition to the oral presentation, a good number of papers were presented in the poster session also. The delegates were taken to the Botanic Garden, NBRI, for showing the well documented germplasm collections. Over all, it was a fruitful deliberation for two days on Bougainvillea of the kind that was not held in the last 20 years.

Some of the recommen-dations emerged out of the discussions and deliberations held among the Chairpersons of different sessions and experts during Plenary Session, are as follows: Authentic germplasm should be maintained for catering to the need of research institutes, universities and individuals; Bougainvillea Society of India should have regional chapters at least in metropolitan cities like Kolkata, Mumbai, Chennai for better coordination of activities; Improvement work by way of hybridization and gamma radiation are to be taken up in a much bigger way for development of new cultivars; New areas of research such as bio-chemical studies and molecular studies on hardness and ornamental traits, were identified.

Meeting on Bharatiya Nirdeshak Dravyas (BNDs) Task 4 of CSIR Network Project CMM 24 at NPL

BND review meeting in progress

A review meeting to monitor the progress of 'Preparation and Dissemination of Certified Reference Materials programme — Task 4 of CMM 24 network project of CSIR' was held at NPL, New Delhi, under the chairmanship of Dr Vikram Kumar, Director, NPL. Nearly 50 scientists from several participating laboratories namely NGRI, Hyderabad; NBRI, Lucknow; ITRC, Lucknow; CBRI, Roorkee; RRL, Bhubaneswar; CSMCRI, Bhavnagar; NEERI, Nagpur; IIP, Dehra Dun; NML, Jamshedpur; NIO, Goa; NPL, New Delhi; DMRL, Hyderabad; ARC, Hyderabad; NCCCM, Hyderabad; IOC, Faridabad; NTH, Ghaziabad; NTPC, Noida and IARI, New Delhi attended the meeting.

Dr V. Kumar formally opened the meeting and welcomed the participants. He said that this day was a great day in the history of NPL and BND programme because the world renowned chemical metrologist Prof. Paul Bivre would release a new CRM of High Grade Gold Geochemical Reference Material (BND 3401.01) and delivere two informative lectures. Also, a new era had started with the active participation of a user industry, M/s Hutti Gold Mines Ltd in preparation of this CRM and it would encourage other industries to collaborate with this activity for preparation of CRMs required by them. He suggested to prepare a big plan for preparation of CRMs in other areas like food, clinic, environment and forensic science and include greater number of good laboratories in this programme. He also requested to prepare their proposals for inclusion in the 11th 5-Year Plan and the participating institutes submit these to Dr A.K. Agrawal,

coordinator of the programme at the earliest.

Dr S.K. Gupta, Head, Materials Characterization Division, chaired the meeting in the absence of Dr V. Kumar, Director, NPL. He requested Dr Agrawal, to present the status report and initiate the discussions. Dr Agrawal welcomed all the members and informed that four new organizations i.e. DMRL, Hyderabad; ARC, Hyderabd; NTH, Ghaziabad and ARAI, Pune, had joined this programme and representatives of these laboratories except ARAI, are attending the meeting first time. All the members welcomed the new members. Dr Agrawal congratulated all the members for addition of a new certified reference material in BND family and informed that the number of CRMs available with us had increased to 25. All the nodal scientists of different areas of CRMs presented their reports.

1 **Gold Geochemical Reference Material:** Dr V. Balaram, Scientist, NGRI, briefed the members on the status and method of preparation of gold geochemicals reference materials. The work on preparation of Gold Geochemical Reference Material had been initiated as a collaborative project of NGRI-NPL and M/s Hutti Gold Mines Ltd, Karnataka State (HGML). About 300 kg gold containing rock was collected from Hutti mine and sent to fifteen laboratories in India, Canada, China and Tanzania to measure the concentration of gold and other major, minor, trace and all the REE elements.

2 **Spectroscopic Metals and Alloys**: Dr K.K. Gupta, Scientist, NML, presented the status of preparation of low and high carbon steel.

Dr Gupta informed that 5 heats of each alloy weighing 200 kg each with varying concentration of C, Mn, Cr, Mo, Ni, V and Si had been prepared at NML and all the twelve heats are being homogenised. He also informed that it is expected to send all materials for round robin testing to the participating laboratories shortly.

3 **CRM of α alumina**: Dr S. K. Haldar, Scientist, NPL, presented the status of preparation of α alumina. He informed that high purity, crystalline electronic grade α alumina had been procured for preparation of intensity CRM. The material was sent to thirteen laboratories for round robin testing for its certification. It is expected that material will be certified with in few months.

4 **Petroleum Standard:** Dr A. K. Singh, Scientist, IIP, Dehra Dun, described the method of preparation of petroleum standard. He informed that organo-metallic compounds of Na, Ca, Mg, Fe, V etc have been synthesized at IIP and these were dissolved into petroleum quantitatively and handed over to NPL for certification. Dr Agrawal informed that the material was sent to 20 participating laboratories for round robin testing along with

A group photograph of Scientists from the various laboratories participating in BND Programme

protocol of testing to measure the concentration of Na, Ca, Mg, Fe and V. Material will be certified after the receipt of the analytical reports.

5 **Mono Elemental Solutions:** Dr Agrawal informed that the following new elemental solutions had been prepared and sent to 20 participating laboratories for round robin testing.

i)	BND	105.01:	Lead
ii)	BND	205.01:	Cadmium
iii).	BND	1205.01:	Zinc
iv)	BND	1305.01:	Iron
v)	BND	1405.01:	Copper
vi)	BND	2101.01:	Strontium
vii)	BND	2201.01:	Cobalt
viii)	BND	2301.01:	Magnesium
ix)	BND	2401.01:	Barium
x)	BND	2501.01:	Chloride
xi)	BND	2601.01:	Sulphate

He reported that the results have been received from 11 laboratories for most of the elements except eight for Ba, six for Sr, four for Cl and three for SO_4. He requested the remaining laboratories to send the results at the earliest.

6 **Nature Water:** Dr Agrawal informed that nature water sample had been collected from granite hard rock area of Vairapalli near Hyderabad for certification of cat- ions and anions. The cations and anions had been stabilized by the addition of sub-boil distilled hydrochloric acid and thymol, respectively. Both the materials i.e. BND 2701.01: Nature Water I and BND 2801.01: Nature Water II had been sent to the 18 participating laboratories to measure the concentration of cations and anions, respectively.

7 **Pesticides:** In absence of scientist of IICT, Hyderabad, Dr Agrawal presented the status report of pesticides. He informed that four pesticides, i.e. BND 1701.02: Chlorpyriphos; BND 2001.02: Isoproturon; BND 3101.01: Fenvalerate; BND 3201.01: Cypermethrin, which had been prepared and purified at IICT, Hyderabad, were sent to thirteen participating laboratories for round robin testing. The analysis reports from the laboratories are awaited.

8 **Gas Mixture Standard:** Shri Prabhat K. Gupta, Scientist, NPL, reported the status of certified reference material of gas mixtures. He informed that a new CRM of carbon dioxide in nitrogen had been prepared at NPL. Its stability had also been studied. He told that this sample is ready for round robin testing.

9 **Food Standard – Skimmed Milk Powder:** Dr Agrawal pointed out that it was decided after the presentation of Dr M. N. Manjunath, Scientist, CFTRI, in the last BND meeting at Hyderabad that CFTRI will prepare a fresh batch of skimmed milk powder due to vide diversity in the values reported by participating laboratories.

Future Programme

The future programme of the project on BNDs was discussed in detail and every member actively participated in it. Dr Agrawal mentioned that this work has drawn the worldwide attention and recognition. The CRMs prepared under this programme are listed on international database of CRMs created and maintained by COMAR. He also mentioned that nearly 3000 CRMs are required in various disciplines for quality control and assurance. He said that it is the responsibility of this group to produce more CRMs to cover large areas of measurements by involving more laboratories. Most of the members were keen to speed up the production of CRMs but the limitation of manpower was coming in their way. Dr Agrawal requested all members to make a list of CRMs, which could be prepared in their laboratories and include manpower component in their budgetary requirement of 11th Five Year Plan (2007-2012). Proforma of 10th 5-year plan could be used to prepare the proposals. Dr Agrawal also requested the members to suggest the names of the well-established laboratories, which could take the responsibility to prepare the CRMs in other areas. Dr Agrawal thanked all the BND group members for their valuable contribution and suggestions. The meeting ended with a vote of thanks to Prof. Bievre, for releasing the new CRM and delivering two informative lectures and to Dr Vikram Kumar, Director, NPL; Dr V.P. Dimri, Director, NGRI, Shri A.K. David, IAS, Chairman and Managing Director, M/s Hutti Gold Mines Ltd for their support and encouragement for the BND programme.

Solae-CFTRI colloquium

A colloquium on 'Chemistry, Nutrition and Health' was jointly organized by the Central Food Technological Research Institute (CFTRI), Mysore, and the Solae Company, Gurgaon at CFTRI. The colloquium was inaugurated by Shri P. Murari, Adviser, FICCI, Chennai. Dr V. Prakash, Director, CFTRI, Mysore, presided. Later, Shri Jonathan Mcintyre, Vice President, R&D, Solae, USA, inaugurated the Poster Session. The DuPont Protein Technologies Award under the auspices of the Solae Company – Murari endowment fund for the year 2005 was presented to Prof. P. Balaram, Director, Indian Institute of Science, Bangalore, for his contribution to the area of protein and nutrition. Prof. P. Balaram also delivered the vision talk of the colloquium, 'Peptide folding and function: learning from nature'.

In the technical session, speakers from industrial houses, hospitals, academic and research institutions made their presentations on various aspects of nutrition and health. The colloquium also had a poster session to encourage the young researchers and student participants.

The colloquium concluded with a panel discussion, wherein emphasis was laid on the need to focus on the work on proteins and their role in nutrition and health bearing an impact on the society.

In the final phase of colloquium, best poster awards were presented under the categories of R&D personnel and PG students. The colloquium provided a forum for meaningful scientific and technological interactions.

International Workshop on Bioactive Peptides and Their Role in Nutrition and Health Foods

THE Central Food Technological Research Institute (CFTRI), Mysore, organized an International Workshop on 'Bioactive peptides and their role in nutrition and health foods' in association with Norwegian University of Life Sciences, Norway, under the Indo-Norwegian Programme of Institutional Cooperation.

The workshop was inaugurated by His Excellency Mr Jon Westborg, Hon'ble Ambassador of Norway to India. The Chief Guest lauded the efforts of both CFTRI and Norwegian University and highlighted the growing stake in the global biotechnological market for both the countries. Shri P. L. Narayana, Coordinator, Indo-Norwegian Programme of Institutional Cooperation, New Delhi, presented in detail the Indo-Norwegian Programme of Institutional Cooperation, New Delhi. Dr Rajendra Prasad, Head, International Science & Technology Affairs Directorate, CSIR, New Delhi, released a souvenir brought out with topics on emerging areas, such as bioactive peptides from milk, cereals, legumes and oilseeds; structure-function relationship of bioactive peptides; nutrigenomics/proteomics of bioactive peptides; design and development of nutraceuticals and functional foods incorporating bioactive peptides. Dr V. Prakash presided over the function. In a special lecture arranged in the evening, Dr Prakash dwelt upon the topic, 'Peptides-Proteins-Nutraceuticals: Their role in Nutrition and Health'.

The workshop laid emphasis on the role of foods derived peptides in health and nutrition. The work related to the role of peptides derived from whey, casein, legumes, cereals and oilseed proteins in preventing life style-related diseases, health and nutrition was discussed.

National Workshop-cum-Symposium on Sensors and Instrumentation for Food Processing

THE Central Food Technological Research Institute (CFTRI), Mysore, and Biosensor Society of India, jointly organized a workshop cum symposium with the support from Department of Science and Technology, Government of India.

Dr Laxman Prasad, Senior Adviser, Department of Science and Technology, inaugurated the workshop and Dr S. Natesh, Senior Adviser, Department of Biotechnology, Government of India, inaugurated the symposium. The workshop was unique in its composition with faculties from national laboratories and centres of excellence, viz. IIT, IISc, NDRF, NPL, IMTECH and industries, such as Big Tech and TAN Tee joining hands to make the sessions more worthy.

The workshop and symposium covered topics such as sensors and instrumentation for food analysis, automation and control in food processing, biomolecular systems, micro-array, nano biosensors and smart sensors along with practicals to the participants. Poster session and an exhibition of instruments and equipment were arranged with the participation of industries. The event provided a common platform for R&D institutions, universities and industry to interact on emerging areas and forge possible collaborations.

Training Programme on Photometry and Colorimetry

Dr Vikram Kumar, Director, NPL, distributing the participation certificate to one of the trainees

A training programme on Photometry and Colorimetry was conducted at the National Physical Laboratory (NPL), New Delhi in the recent past. This programme was first of its kind since the inception of quality system and the estimation and evaluation of uncertainty in measurement became mandatory for calibration and testing. The idea behind organizing the training programme was to bring together the practicing personnel working in lamp and lighting industries, R and D institutions and to share with them the intricacies involved in the quantitative estimate of the photometric units.

The programme was inaugurated with the initial welcome remarks by Shri S.K. Chakladar, Head, HRM Group and self-introduction of the participants and faculty. This was followed by introductory remarks by course co-ordinator Dr H.C. Kandpal, Scientist F. Dr P.C. Kothari, Scientist 'G' and Head Electrical Standard Division, in the capacity of Acting Director, welcomed the participants and audience and gave a presentation on R & D activities at NPL. There were fourteen participants ranging from the top lamp and lighting industries namely Philips, Crompton Greaves to small-scale industries namely Jamuna Udyog Ltd. Personnel from Calibration and Testing Laboratories namely ERTL (East and West), also participated in the programme. The five-day programme was divided into two parts. The

forenoon session of each day was devoted to the theoretical aspects of photometry and colorimetry in which all the aspects from classical to quantum, mechanical and classical measurements to most modern measurement techniques for LEDs were discussed in great detail. Dr Ranjana Mehrotra, Dr R.K. Garg and Dr H.C. Kandpal, scientists working in the Optical Radiations Standard delivered the lectures. Prof. Kehar Singh, emeritus scientist from IIT, Delhi, was a guest faculty. The afternoon sessions were devoted to hands-on experiments in which each participant was asked to perform the experiments on his own in presence of the experts from NPL.

In the concluding session Dr Vikram Kumar, Director NPL, asked the participants to describe in brief their comments and suggestions about the programme. Valuable suggestions were received about additional information to be included in the technical programme and augmentation of infrastructure facilities. The participants applauded the efforts of the HRM Group and the Optical Radiation Standards section and requested NPL Director to allow the organization of such training programmes more frequently for the benefit of people working in the area. At the end, Director emphasized how improvements in efficiency and correct measurement in light can balance the power shortage in the country. He then distributed the certificates and a copy of the group photograph to each of the participants.

Participants having practical demonstration in laboratory

National Technology Day Celebrations at CSIR Institutes/Laboratories

THE CSIR institutes/laboratories celebrated the National Technology Day (NTD) with great jubilation. The programmes organized on this occasion at some of these are briefly described here:

Central Food Technological Research Institute (CFTRI), Mysore

The Central Food Technological Research Institute (CFTRI), Mysore, celebrated National Technology Day 2006 with Prof. S.K. Joshi, former Director General, CSIR, as the chief guest. During his speech, Prof. Joshi called upon entrepreneurs to team up with institutes like CFTRI to be a significant player in the emerging world food scenario, especially in the area of functional food and nutraceuticals. Prof. Joshi also touched upon the opportunity unfolding in the nano sector having impact in the food processing arena.

Dr V. Prakash, Director, CFTRI, in his presidential address outlined achievements of the institute during 2005-06. He said that CFTRI patent portfolio has now crossed a landmark, reaching 1000 this year and for the last 5 years successively, the institute has been able to file 100 patents annually.

On this occasion, National Technology Day insignia was presented to 26 entrepreneurs who had availed CFTRI processes or know-how during 2005-06. While thanking for the support given by 'Team CFTRI', Shri Nalin Merchant, Laljee Godhoo & Co., Mumbai, a company which has been marketing asafoetida for more than a century, described how the partnership with CFTRI has been able to help them to compete in the global market.

Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow

On the occasion of National Technology Day, Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow, organized a Scientist-Farmer-Industry convergence.

A unique convergence of students, common people, farmers, industry represen-tatives, traders of essential oils and herbal product dealers and scientists was clearly visible. In the forenoon, large number of students visited labs and CIMAP farm to apprise themselves of the ongoing researches at CIMAP. A documentary film on CIMAP's activities and achievements was also screened on the occasion.

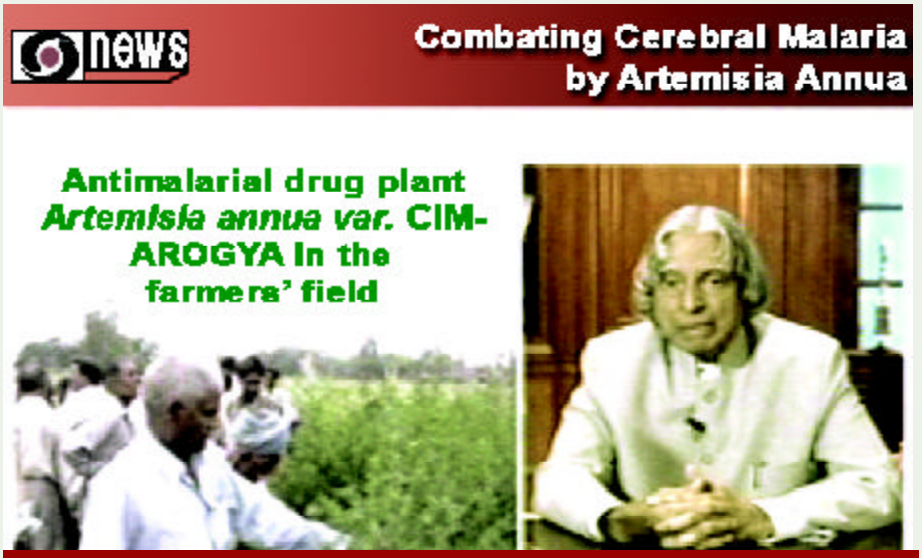
CIMAP also organized a business and entrepreneurship enabling meeting in medicinal and aromatic plants (BEE –MAPs) which was attended by more than 200 participants comprising representatives from industry, government departments, banking sector, traders, farmers, scientists and policy makers. The points which were deliberated in detail included prioritizing MAPs and crops, quality material production, marketing and trade, policy issues such as national programme, financial support and regulatory aspects and defining herbals - their scientific basis and status.

Dr S.P. S Khanuja, Director, CIMAP delivering his address

The companies who participated in the meet include Paras, Baidyanath, Vital, Scimitar, Emami, Avesthagen, IPL, Shaivi, Padmavati Herbs, among others. The meet was attended by the officers of SIDBI, NABARD, SBI, Bank of India to provide their inputs on financial assistance available for the farmers and entrepreneurs. The officers from KVIC, Sri Ram Institute, Delhi, Senior Superintendent, Lucknow Model Jail and senior reporters from local newspapers such as *Times of India, Hindustan Times, Hindustan, Dainik Jagran, Aaj, Swatantra Bharat* and *Rashtriya Sahara* were also present.

On this occasion, progressive farmers from UP and Uttaranchal were also felicitated. Shri Rakesh Kumar of Barabanki and Shri Prem Singh Rawat of Chmpawat were awarded Sathi (Companion) prize, Shri Dinesh Kandpal of Almora Udyami

One of the women farmer (Sakshama) being felicitated



In his Technology Day address on Doordarshan, Hon'ble President of India Dr A.P.J. Abdul Kalam categorically lauded the work being done by CIMAP on Artemisia Biovillage Mission, the agro and processing technology of Artemisia annua and buy-back policy through industries.

(Entrepreneurship), Shri Mrigendra Kumar of Haldwani and Shri Dan Singh of Bageshwar Khoj (Innovation), Shri Ajai Rai of Mau and Shri Kundan Singh of Bageshwar Unnati (Progress) and Smt. Govinda Devi and Smt. Rani Devi of Barabanki were awarded Sakshama (Capable) prizes for their outstanding contribution in various areas of medicinal and aromatic plants.

New publications such as '*MAPs Dew*', CIMAP Newsletter, *CIM-Aina* and *Gyanankur* were released.

Dr S.P.S. Khanuja, Director, CIMAP, addressed the scientists and said that Team CIMAP has shown the inclination as well as the will to move on this route by synergizing capabilities and expertise, adopting mission mode, multi-disciplinary projects. And this is becoming well evident from the three baseline disciplines A,B,C (Agricultural, Biological and Chemical Sciences) of CIMAP that are translating into research making value chain of medicinal and aromatic plants (MAPs) a reality of linking science and society, he added. Elaborating further Dr Khanuja said that in this effort industry is emerging as the completely involved and willing partner. Dr Khanuja said that from analytical to discovery steps the combining of finer knowledge streams (genomics, biotechnology, chemical technology, breeding, agrotechnology and bioactive molecule prospecting, etc.) is happening as the forceful scientific stream that makes the way for technologies of future.

A 'Knowledge Tour' to *Manav*, The Concept Medicinal Plants Garden, was also organized. People from various sections of the society went round the medicinal plants beds in the garden corresponding to human organs and acquainted themselves with the uses of valuable medicinal plants in curing different ailments of human body.

In his Technology Day address on Doordarshan, Hon'ble President of India Dr A.P.J. Abdul Kalam categorically lauded the work being done by CIMAP on *Artemisia* Biovillage Mission, the agro and processing technology of *Artemisia annua* and buy-back policy through industries.

Discussion-cum-interaction session in progress at CIMAP

Central Scientific Instruments Organisation (CSIO), Chandigarh

The Central Scientific Instruments Organisation (CSIO), Chandigarh, celebrated National Technology Day by holding an open day. All the labs of CSIO were kept open for general public. A large number of visitors including students from various engineering colleges, universities and general public went around various laboratories of the organisation. They interacted with the scientists and were given exposure to the technologies developed at CSIO.

School students visiting CSIO during NTD celebrations

Later in the afternoon, Padamshri V.S. Sethi, Director, Terminal Ballistics Research Laboratory, Chandigarh, delivered a lecture on 'New Concept in Pulse Power Technology'. He, in his address, opined that the success of many scientific and engineering challenges lies in the generation of high-energy pulses and the technology that makes the production of these high-energy high-current pulses possible is termed as pulse technology. Modern research is focused on the innovation of such weapons for the wars in 21st century, which meet the objective of defeating enemy without inflicting permanent injury or loss of life. High Power Microwave (HPM) and Electro Magnetic Pulse weapons may be some of these kind of weapons.

Earlier, Dr Pawan Kapur, Director, CSIO, while welcoming the Chief Guest, highlighted the contributions of CSIO in different areas such as Medical, Social and Defence sectors. He called upon the staff of CSIO to make concerted efforts in research and development in the areas directly related to the masses and leading to the improvement of quality of their life style.

The programme concluded with the vote of thanks by Shri J.K. Chhabra

National Botanical Research Institute (NBRI), Lucknow

The National Botanical Research Institute (NBRI), Lucknow, celebrated the National Technology Day by observing 'Open Day'. Its laboratories, exposition, library, botanic garden, Banthra and Aurawan research stations were visited by people from various sections of the society. They had an opportunity to personally witness the technological capabilities, attainments and achievements of NBRI and interact with the scientists.

On this occasion, a function was organized at NBRI auditorium. Dr Jitendra Prasad, President, *In vitro* International Pvt. Ltd, Bangalore, was the chief guest. A number of leading dignitaries and representatives from other CSIR laboratories also attended the function. Welcoming the Chief Guest, Dr Rakesh Tuli, Director, NBRI, Lucknow, said that National Technology Day was celebrated to give tribute to technological accomplishments of the nation. He informed that NBRI is in the process of identifying some grand challenge projects keeping in view the competitive science and national priorities.

Dr Jitendra Prasad in his lecture entitled 'Floriculture: Biotechnology and Business', spoke about the scope, application and economics in floriculture and floricultural biotechnology. He said that there was huge market for floriculture that included cut flowers (US$ 90 billion), pot plant species (US $ 60 billion) and garden plant species (US $ 40 billion). Briefly describing the various biotechnological approaches employed in the floriculture industry, he said that biotechnological manipulation in floriculture crops was easier and more cost-friendly as compared to agricultural and horticultural crops. The global demand for healthy planting material (that includes agricultural, horticultural and floricultural crops) is 16 trillion seedlings worth US $ 4 trillion, he informed. He also outlined some strategies for business formulation in floriculture industry. He highly appreciated the accomplishments of NBRI in the field of floriculture and tissue culture.

Transfer of technology on the occasion of National Technology Day at NBRI

Earlier, Dr R. K. Srivastava, Scientist, NBRI, outlined the various technologies developed by NBRI. Dr S. K. Datta, Scientist, NBRI, highlighted the past achievements, gave details of the researches and progress at NBRI and outlined future strategies of the floriculture division. On this occasion, two technologies of NBRI, namely, *Bacillus*-based microbial technology and *Trichoderma*-based microbial technology were transferred to two companies – M/s Balaji Crops Care Ltd, Hyderabad and Varanasi Bioresearch Pvt. Ltd, respectively. Both these technologies are biofertilizer-based technologies aimed at developing integrated approaches for enhancing the yield of plants on environment sustainable manner.

On this occasion, Vigyan Vani 2005-06 – a Rajbhasha Patrika, published by NBRI, was also released. Dr S. K. Tewari, Secretary, Office Language Implementation Committee, NBRI, Lucknow, summarized the efforts being made at NBRI for promoting science through Hindi medium.

Regional Research Laboratory (RRL), Bhopal

The Regional Research Laboratory (RRL), Bhopal, celebrated National Technology Day (NTD) jointly with Regional Science Centre, Bhopal at Regional Science Centre. A painting competition on 'Science and Technology in Daily Life' was organized for school children of various age groups.

On the occasion, Dr N. Ramakrishnan, Director, RRL, Bhopal, inaugurated the Scanning Electron Microscope, gifted to Regional Science Centre by RRL.

The three-day programme consisted of Science Quiz, Open Science Quiz, Interaction of Scientists with Students, Science Film Show and Sky View.

Printed and Published by V.K. Gupta 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. 200 Single Copy: Rs. 10.00
Subscription Complaint No 25843359
RN 4512/57