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Team CSIR

Fresh Chilli Processing plant inaugurated at Byadagi, Karnataka

Built on turnkey basis by the National Institute for Interdisciplinary Science & Technology (NIIST), Thiruvananthapuram, a 20 tonnes/day fresh chilli processing plant was inaugurated on 21 March 2008 by the Minister of State for Commerce Shri Jairam Ramesh, at Byadagi, Karnataka.

This facility, created in the heartland of Chilli trade, symbolizes the synergy of two governmental agencies putting together their resources for a common goal----finance by STCL and technical support by CSIR.

First of its kind in India, the chilli processing plant, will produce world class quality, aflatoxins-free, Byadagi chilli with high colour to meet stringent international standards. The washing of the fresh chilli prior to processing will ensure the removal of surface mud, dust and pesticides if any.

The price of the chilli is determined by the moisture content and the high colour value and low aflatoxin levels. Conventional sun drying, which takes 10 to 12 days, results in improper drying, loss of carotenoids, development of aflatoxins and accumulation of dust, bird droppings, etc. Unlike the conventional process of sun drying the fresh chilli, this facility will process the garden fresh chilli to the end product within a few hours of its reaching the factory. This will ensure an end product with a colour value, at least 20 % higher than that would have been possible through the conventional means. The enhanced colour value is expected to result in a proportionate increase in prices. The marketing expertise of the client promises to crown this facility as a trend setter in the chilli processing sector in the years to come.

The major beneficiaries of this project will be the chilli growers of the region with the processing technique adopted at this unit ensuring a commercially viable, premium product.

NIIST has been doing pioneering work of this kind for decades and its technical expertise in the area of spices has been extended to regions as far as Manipur and Meghalaya. NIIST's next venture is in the state of Sikkim.

Grant-in-aid/Sponsored/Consultancy Projects taken up and Technical Services rendered by CECRI

The grant-in-aid/sponsored/consultancy projects taken up, and technical services rendered by the Central Electrochemical Research Institute (CECRI), Karaikudi, during July-December 2007 include:

Grant-in-aid/Sponsored Projects

- Evaluation of 'Sarana' stationary cells as per IS 1651:1991 specification and sulphation test (2V cells) for 2V/120Ahb, Sarana Industries, Chennai
- Design, develop and supply of one high power Galvanostat 12A, 20 V, Binani Zinc Ltd, Cochin
- Corrosion study of paint coated steel panels, M/s Century Industries Pvt. Ltd, Chennai
- Evaluation of testing protocols for PEFC single cell, ENEA, Rome
- Evaluation of 2V/200 Ah "Jumbo" low maintenance tubular cells, United Leadoxide Products Pvt. Ltd, Goa
- Evaluation of 'Exide' YHP Plantae cells for three-h capacity and short-circuit and internal resistance tests on 12V battery for six designations, Exide Industries Ltd, Kolkata
- Development of zinc-alloy (with reduced zinc%) for zinc carbon cells, Eveready Industries India Ltd, Kolkata
- Optimization of the processing of PVA-PSSA membrane for application in DMFC, Applied Materials Inc, USA
- Electrochemical synthesis of lanthanum and europium hexaborides by molten salt technique, BRNS, BARC, Mumbai
- Feasibility study on electroless nickel plating of aluminium drums for textile applications, Veejay Lakshmi Engg. Works Ltd, Coimbatore
- Development of pulse electroplated target for high current irradiation in cyclotron, Department of Atomic Energy, Mumbai
- Novel nanocomposite polymer electrolytes for lithium batteries, Ministry of Science & Technology, New Delhi
- Degradation of dyes and refractory organic contaminate from textile and other organic industrial effluents, Ministry of Environment & Forests, New Delhi
- Enhanced process for the removal of nitrate from water, IFCPAR, New Delhi

Consultancies

- Design of electrolytic defluoridator of 1000 LPH capacity, Sandur Fluid Controls Pvt. Ltd, Bangalore
- Installation and measurement of strain by SMER gauges for leak test, Rajasthan Atomic Power Project-5 & 6, NPCIL, Rajasthan
- Recommendation of paint scheme for the structures and pipelines at oil terminals, Cochin Port Trust, Cochin
- Advice on the corrosion and its control for radiator, Ashok Leyland, Chennai
- Advice on principle of application on anastical industries, Sterlite Industries Ltd, Tuticorin
- Soil resistivity biological and chemical analyzing soil samples at Chennimalai and suggesting suitable remedial measures, TWAD, Kangeyam
- Corrosion control for pumps in cell house, Hindustan Zinc Ltd, Putholi
- Setting up of the Eco-Electroplater's Industrial Park at Madurai, Electroplaters & Metal Finishers Association of Tamilnadu, Madurai
- Advisory consultancy on setting up of commercial plant for regeneration of acidic cupric chloride etchant with simultaneous recovery of copper with a capacity of 250 kg per day, AT& S India Pvt. Ltd, Nanjangud
- Recommendation for anticorrosive coating to PSC main, TWAD, Ramnad
- Design improvement in the electrolytic production of Permanganate, Universal Chemicals & Industries (P) Ltd, Ambenath

Technical Services

- Testing of blended Organophosphonate samples, NLC Ltd
- Supply of 24 titanium substrate insoluble anodes for R&D work, Corrosion Division, CECRI, Karaikudi
- Coating of lithium battery materials using electrode coating machine, VSSC, Thiruvananthapuram
- Testing of liquid paint samples, ENERCON (India) Ltd, Daman
- Testing of CPCC coated reinforcement rods in proposed construction of Majour Railway Bridagae No 271 between Manamadurai and Karaikudi as per CECRI code of practice, Office of the Asst Executive Engineer, Gauge Conversion, Southern Railway Manamadurai
- Evaluation of Amararaja VRLA batteries of 2V, 500Ah capacity as per IR specification No S93-96 Amendment 01 dt 02.12.1998, Amararaja Batteries Ltd, Karakambadi, Tirupati
- Identification of a viable testing method for electroplating gold on various substrates, Smart Creations, Chennai

Indian Institute of Chemical Technology, Hyderabad

R&D Highlights: Biology and Biotechnology

The activities/accomplishments of Indian Institute of Chemical Technology (IICT), Hyderabad, in the field of Synthetic Organic Chemistry & Drug Intermediates, Natural Products, Agrochemicals & Pheromone Chemicals, Fluoroorganics, Inorganic & Physical Chemistry, Lipid Science & Technology, and Organic Coatings & Polymers were published in *CSIR News*, 58(2008), 86. Presented here are the contributions of the institute in the field of Biology and Biotechnology:

Control of malaria through integrated information technology tools in Arunachal Pradesh (DST): A systematic database has been developed based on the prevalence of malaria in Arunachal Pradesh. This database helps correlate between various parameters to predict outbreak of the disease. Customized software has been handed over to the health officials of Arunachal Pradesh for its subsequent implementation.

Biotechnology Information System (DBT): Integrated control of Filariasis and Malaria through Decision Support System (DSS) in Andhra Pradesh, sponsored by DBT, Government of India, was undertaken. The software has been utilized to process the existing data for validation. Self-organizing Maps (SOM) and Classification and Regression Tree tools have been also implemented for giving priority to the endemic zones of Malaria. The same

software will be utilized for the implementation in the Malaria and Filaria endemic zones of Andhra Pradesh.

Development of high yielding silkworm varieties depending upon the eco-climatic condition of Andhra Pradesh (DST): The available germplasm stocks of IICT were utilized for development of the silkworm breeds tolerant to high temperature and BmNPV through the conventional breeding method. It was found that some of the multivoltine and biovoltine breeds exhibit promise to tolerate the BmNPV at LC50 dose. The whole germplasm will be subjected for the screening of tolerance to high temperature in the subsequent generations.

Environmental Management for the control of vectors and vector borne diseases (Ministry of Environment and Forests, Govt. of India): All the information related to the mosquito borne diseases such as Filariasis, Malaria and Japanese Encephalitis were included in the URL of ENVIS CENTER – BIOINFORMATICS –VECTOR CONTROL (www.iictenvis.nic.in). Periodical updatation of information on vectors and vector borne diseases has been incorporated in the website for the benefit of the end users.

Integrated Information System for control of Bancroftian filariasis in Andhra Pradesh (MCIT): The main objective of the project is to implement datamining applications for the control of filariasis in Andhra Pradesh. In the present study, epidemiological and entomological parameters have been collected from 120 villages of four districts, i.e., East Godavari, West Godavari, Karimnagar and Chittoor subjected for classification and clustering tools. The outcome of the results will be plotted on GIS to take appropriate action at an appropriate place and time.

Isolation of collagens from marine sponges: Focusing on therapeutic importance: The main focus of the present work is to isolate and characterize certain collagens of marine sponges for their therapeutic applications, to avoid immunogenic problems aroused by the use of vertebrate collagens.

Kairomones for control of insect pests: Several plants and plant parts were evaluated for their efficiency in protection of stored maize from pests and diseases. Floral extracts of three plants have shown excellent grain protectant activity and the active compound was isolated by analytical techniques.

Toxicity assessment of nanomaterials using in vivo model system (Funded by "Asian Office of Aerospace Research and Development", Japan): The objective of the project is to identify potential adverse effect of nanomaterials by conducting acute and toxicokinetic studies in rat by oral exposure route. The knowledge gained from these investigations will be helpful in showing the usefulness of *in vitro* studies in predicting the possible health hazards that may arise from occupational exposure to nanomaterials or the introduction of the nanomaterials into the environment. The outcome of this study will be useful in predicting the potential hazards owing to nanomaterials exposure.

Pharmacology

The Pharmacology Division caters to the need of in house and pharmaceutical industries. It is actively involved in R&D activities related to novel drug delivery systems for various drugs. The projects include formulation, pharmacokinetic and pharmacodynamic evaluation, which authenticates the outcome and its application to other drugs.

CSIR Network Projects

IICT successfully completed the CSIR Network Projects, CMM06 and COR-003. Some of the milestone achieved are enumerated below:

(A) Developing Green Technologies for Organic Chemical (CMM-06):

This project was conceived and identified by CSIR with IICT as nodal laboratory during the Tenth Five Year Plan. The other participating labs are CIMAP, IHBT, IIIM (RRL, Jammu), NEIST (RRL, Jorhat), NIST (RRL, Thiruvananthapuram), NCL, CSMCRI, CFRI, IMMT, (RRL, Bhubaneswar), CECRI, IIP and NEERI. The major objectives of the project were to develop new products/processes/catalysts/reagents/techniques, which attribute green concept. Some of them are as follows:

- **Green processes for bioactives from medicinally important natural products—**Extraction and isolation of artemesinin in 5 kg batch.

- **Pheromone chemicals for integrated pest management—** Laboratory scale synthesis of pheromone components IV (E11-hexadecene-1-ol) and V (E11-hexadecenyl acetate) (25 g batch); Synthesis and up-scaling of the process technology for pheromone components I (Z11-hexadecen-1-ol), II (Z11-hexadecenal) and IIIZ11-hexadecenyl acetate) has been completed on 25 g batch size.
- **Organic chemicals from biomass and agro industrial wastes—**Work involved production of polylactic acid (PLA) from biomass, Production and recovery of organic chemicals from industrial wastes , Gamma linolenic acid from agro products.
- **Alkylation and oxidation of aromatic compounds—**Modified zeolite catalysts for alkylation of naphthalene with methanol using zeolite catalyst and oxidation of p-xylene to terephthalic acid in aqueous phase.
- **Fluoroorganics by chemical/ electrochemical methods—** Process for trifluoroethanol demonstrated on batch scale (batch size, 300 g), Process for heptafluoropropane (FM200) demonstrated on bench scale/ single tube container reactor, 70 gm/h perfluoroisobutyric acid was produced by electrochemical fluorination (5 g) and Developed on bench scale process for 1,1,1-trifluoro-2,2-dichloroethane (HFCFC-123) (ready for demonstration).
- **Novel Mesoporous Nanomaterials —**Novel mesoporous materials were synthesized and characterized. They are used for methane and hydrogen adsorption/desorption studies.

During 2005-07 the R&D work undertaken in this project could fetch 22 publications in SCI journals. Two technologies were generated and transferred to outside parties while 8 patents, both Indian and foreign were filed.

(B) Globally Competitive Chemicals, Processes and Products (COR-03)

In this project, IICT was the nodal laboratory and other participating labs were NCL, NEERI, IHBT, CSMCRI, IIIM (RRL, Jammu), NIST (RRL, Thiruvananthapuram), IIP, CIMAP and CFRI. The major objectives of the project were to develop globally competitive chemical entities, processes and products of high commercial value, which fulfill the parameters like high performance reactions, attractive for global markets internationally patentable new knowledge and technology leadership provider for India.

Use of alternative feedstocks of global importance/progress achieved during the reporting period is given below:

- **Tissue culture and processing of natural dyes—**Calli formation with respect to its proliferation/ growth medium optimized; Nature and texure of calli were documented and used for biosynthesis of indigotin; Process know-how was developed for xanthophyll dye from *T. erecta* flowers.

Functional dyes

Dipotassium Rhodizonate, Dipotassium Croconate, Barium Croconate, Croconic acid have been prepared at gram level to use for the synthesis of NIR dyes.

High atom efficiency processes for bio-active and speciality chemicals.

As per the signed agreement, lab scale work for Taxol side chain was finished and demonstrated to the industry. Lab scale work on Diltizem is under progress.

Various catalysts were developed and tested. Titanium oxide electrodes have been prepared from chemical grade TiO_2 and some characterization studies have been initiated. Electrolytic cell system suitable for conducting experiments in a muffle furnace was set up and experimentation initiated.

DME from CO and CO_2

Aluminum phosphate catalysts and aluminum zirconium phosphate were prepared and tested for dehydration of methanol to DME.

Water for H_2 production via solar energy irradiation

Different materials were prepared and tested for water splitting using mercury lamp.

Ammoxidation for the synthesis of aromatic and heteroaromatic nitriles

Preparation of 50 g and 100 g batch of isonicotinamide and INH has been standardized getting 95%

yield of INH with high purity; A promising catalyst formulation has been identified for the synthesis of p-methoxy benzonitrile.

Direct hydroxylation/oxidation of benzene and its derivatives

New catalyst systems Cr-terephthalate mesoporous materials were prepared for direct hydroxylation of benzene.

During the 2005-07, the R&D outputs of the project could fetch 18 publications in SCI journals. Besides, 3 patents, both Indian and foreign were granted while one technology was generated.

New Bioactive Molecules for Drug Applications

Efforts were made to find suitable industrial partners for further development of existing molecules. AP-9cd, an anticancer herbal composition from *Cedrus deodara* is undergoing further studies at M/S Indigene Pharmaceuticals Ltd, USA. AP-76p, a new antigastric ulcer herbal formulation is under preclinical toxicology studies at CDRI, Lucknow. Single molecules related to furanocoumarins isolated from *Aegle marmelos*; AP-20am14, AP-20am15 and AP-20am16 are also undergoing preclinical toxicology studies at CDRI, Lucknow. These candidates have arisen from the CSIR coordinated programme on bioactive molecules which is now continuing as Task Force Project. Efforts are also under way to find a suitable industrial partner for the development of single molecule isolated from *Oroxylum indicum*, a new natural agent for treatment of gastrointestinal toxicity, associated symptoms and ulcers.

DST sponsored National Facility for Combinatorial Natural Products

Drug discovery is a complex, interdisciplinary pursuit of chemistry, pharmacology and clinical sciences, which has benefited humankind immensely over the last 100 years.

IICT has taken up following projects related to chemical standardization of medicinal plants, their formulations and *Bhasmas* used in traditional systems of medicine such as Ayurveda and their safety and toxicological studies:

1. Quality Assurance and validation of some Ayurvedic formulations for life-style related and gynecological disorders (DST/IICT/IMPCL)
2. Studies on the bioavailability, toxicity, safety and characterization of *Bhasmas* produced by traditional and modern manufacturing processes (DST/IICT/IMPCL)
3. Golden Triangle Partnership project on Standardization of Ayurvedic formulations and chemical analysis, toxicity/safety studies on *Bhasmas* (CSIR/AYUSH/ICMR)
4. Protection of communal rights and traditional knowledge relating to plants and traditional medicines with ST's of Andhra Pradesh (Sponsored by Tribal Welfare Department, Govt. of AP):

On the request of M/s Maharashtra Hybrid Seeds Company Ltd (Mahyco), IICT has carried out the following analysis successfully: Isolation and identification of the major alkaloid principles in *S. melongena* and its Bt variety; Development of analytical methodology for the quantification of the major alkaloid; and Comparison of the chemical (alkaloid) fingerprints of both the varieties.

Patent Applications filed by CLRI

The following patent applications have been filed by Central Leather Research Institute (CLRI), Chennai, in the recent past:

Filed in India

- A novel alkaline protease and a process for the preparation thereof (Patent Application No. 2375 Del 2007)

Filed in United States Patent & Trademark Office (USPTO)

- A tanning composition and a process for the preparation thereof (Patent Application No.11/877, 878)
- A novel protease for industrial applications (Patent Application No.11/ 931,537)

International Symposium on Viruses of Ornamental and Temperate Fruit Crops

The Institute of Himalayan Bioresource Technology (IHBT), Palampur, organized a two-day international symposium on "Viruses of Ornamental and Temperate Fruit Crops" during 17-18 December 2007. The event was supported by CSIR, DBT, DST, INSA and NHB and attended by scientists from USA, Italy, France, Poland, Israel, Russia, Czech Republic, Iran and India. A number of apple growers, floriculturists and other stakeholders were also present.

Inaugurating the symposium Prof. Anupam Varma, Vice President, INSA, highlighted the historical perspective on the spread of some plant viruses globally.

Earlier, welcoming the participants, Dr P.S. Ahuja, Director, IHBT, emphasized the importance of having a sensitive system for quarantine certification to prevent the spread of diseases. He also highlighted the R & D being done at the institute in devising strategies for detection, diagnosis and prevention of viruses and viroids.

Eminent virologists Dr A. Hadidi from USA, Dr A. Gera from Israel and Dr M. Barba from Italy, emphasized the importance of the symposium in developing world-class virus control strategies. Dr Barba also described the role of European Plant Protection Organization (EPPO) in monitoring pathogen spread and devising strategies for their effective detection in Europe.

The plenary session which followed the inaugural session, comprised lectures by Dr A. Hadidi, Dr A. Gera and Dr M. Barba. This session was followed by the first session on Virus Detection Methods, where talks were presented by Dr Bruno Gronenborn, France, on nanoviruses; and Dr Maryam G. Zamharir of Plant Disease Department, Plant Protection Institute of Iran on Detection of almond witches broom phytoplasma in important almond growing areas of Iran.

Dr Moshe Bar-Joseph, Israel, described viruses of *Closteroviridae* family infecting ornamental plants. Dr Beata Komorowska, Poland, presented the work done on Nucleotide sequence analysis and detection of some Cherry green ring mottle virus isolates. Dr Pradeep Kachroo, USA, talked about Resistance gene-mediated signaling against turnip crinkle virus in *Arabidopsis*. This talk was followed by presentation of Dr Sangeeta Saxena, Lucknow, on *In-silico* search for potential siRNA sequences to develop geminivirus resistant fruit crops. Dr Mikhaylov Roman, Russia, deliberated on 'How RNA silencing can be utilized for fruit trees breeding?' Dr Tatiana Mitiouchkina of the same institute presented her work on 'Development of transgenic lines of *Chrysanthemum* against *Chrysanthemum virus B*'.

Dr B. P. Singh, Scientist, Institute of Genomics and Integrative Biology (IGIB), Delhi, emphasized the role of allergenicity and toxicity assessment of genetically modified foods. Dr Vipin Hallan of IHBT described molecular characterization of 33 geographical isolates of *Chrysanthemum virus B* from India. Dr I. D. Garg, CPRI, Shimla, presented a talk on the role of electron microscopy in the detection and identification of viruses of horticultural and floricultural crops. Prof S. V. Bhardwaj, Dr P. D. Thakur, Dr Manju Modgil, Dr Anil Handa and Dr M. Luqman Khan of Dr Y. S. Parmar, University of Horticulture and Forestry, Nauni-Solan, India, talked about phytoplasma, production of virus-free planting material and vector management. Dr D. B. Parakh, NBPGR, emphasized on how strict quarantine laws would be helpful in control of pathogen spread worldwide, with implications in the long run.

A poster session was also organized during the symposium. Fifty-eight posters were presented on various aspects of plant virology especially diagnostics, resistance, production and certification of virus-free plants, viroids and phytoplasmas in ornamental and temperate fruit crops. Best poster award was given to E. Glick, L. Singh, Y. Levy and Y. Gafni, Israel, for the poster entitled "Suppression of gene silencing in *Tomato yellow leaf curl virus*, Israel".

The concluding session was

chaired/co-chaired by Dr A. Hadidi (USA), Dr Marina Barba (Italy), Dr A. Gera (Israel) and Dr P. S. Ahuja (India). It was pointed out that it is very important to work out molecular characteristics of Indian isolates/strains using appropriate technologies. Intricate details of the infecting viruses must be identified otherwise some vital information may be lost leading to a gap in developing control strategies. Although lot of information is available at EPPO, a good level of standardization and optimization is needed for our own isolates. It was strongly recommended that germplasm conservation is very important and may encompass within some useful genetic information to combat existing pathogens in cultivated crops. All species must be conserved before we lose them forever. Identification of latent infections is very important as these go undetected and may act as source of infection in due course.

Growers present on the occasion discussed their problems encountered in the field. They emphasized the role of a strict quarantine system to develop a world of ornamental and temperate fruit crops free from plant viruses and look at the strategy to help in minimizing the spread of pathogens.

The symposium also underscored the importance of collaboration between university and R&D institutes to develop a suitable certification system based on a database on all the infecting pathogens for improvement in yield potential in the Indian scenario.

Meeting of Technical Committee for Mass and Related Quantities (APMP-TCM)

The eighth meeting of the APMP Technical Committee for Mass and Related Quantities and the associated technical workshop was held at Standards Australia, Sydney, Australia, on 29 - 30 November 2007. Twenty-six delegates attended the meeting, representing various National Metrology Institutes from 17 countries under Asia Pacific Metrology Program (APMP). The meeting was chaired by Dr A.K. Bandyopadhyay of the National Physical Laboratory (NPL), New Delhi, who presented the agenda for the meeting as well as the programme for the technical workshop. Mr Mark Fitzgerald of MSL, New Zealand, was unanimously appointed as the rapporteur.

At the outset, minutes of the Seventh TCM meeting, the Third Pressure and Vacuum Workshop and associated symposium that were held on 13 - 14 December 2006 in New Delhi, were presented.

Matters arising from the minutes of the seventh TCM meeting, e.g. holding of the Fourth Pressure and Vacuum Workshop at KIM LIPI, along with the APMP General Assembly in Indonesia and problems pertaining to transportation

Delegates of 8th Meeting of the Technical Committee for Mass and Related Quantities (APMP-TCM) (*from left*):
Sitting: Dr S.Y. Woo (Korea), Dr Renanta Hayu (Indonesia), Dr Chris Sutton (New Zealand), Dr A.K. Bandyopadhyay (India), (Chairman,TCM), Dr Noel Bignell (Australia), Dr Rungsiya Sukhon (Thailand), Ms Kitty Fen (Australia).
Standing (first row): Mr Dao Duy Hung (Vietnam), Dr K. A. Gunasoma (Srilanka), Dr Yao Hong (China), Dr John Man (Australia), Dr Lee Shih Mean (Singapore), Dr Tassanai Sanponpute (Thailand), Mr Neville Owen (Australia), Mr Chen Soo Fatt (Malaysia), Dr Hou Leng (Hongkong), Dr Jiong-Shiun Hsu (Taipai)
Standing (second row): Mr Anare T. Vadei (Fiiji), Dr Masaaki Ueki (Japan), Dr Tokihiko Kobata (Japan), Mr Mark Fitzgerald (New Zealand), Dr Veera Tulasombut (Thailand), Dr B. F. van der Merwe (South Africa), Dr Stuart Davidson (UK), Dr Tawat Changpan (Thailand), Dr Hitoshi Akimichi (Japan)

of artifact such as hydrometers were discussed.

The minutes were unanimously accepted.

Technical Workshop

The technical workshop started on 29 November with Dr Stuart Davidson, NPL, UK, talking about the reasons behind the name change of EUROMET to EURAMET and on the current and planned activities of EURAMET. Presentations were made on progress of comparisons, country reports, development of standards for mass and related quantities and technical aspects of mass and related quantities measurement.

A special session was held on Developing Economies (DEC) under APMP, covering reports on progress of comparisons, country reports and other activity. The session started with the presentation of a report on APMP.M.M-K6 key comparison of mass standards by Mr Dao Duy Hung, VMI, Vietnam. It followed by a report presented by Mr Soo Fatt Chen, NML-SIRIM, Malaysia, regarding the preparatory workshop APMP/DEC pressure comparison in Sepang, Malaysia (5 - 7 November 2007). Intended for DEC this training programme was held with the financial help of PTB (Germany).

In his presentation, Dr Bandyopadhyay informed the members that 'Draft – A' report of the APMP.M.M-K2 key comparison of mass standards was in circulation. He also informed that the long pending APMP.M.P-K6 pressure comparison had been linked successfully with the corresponding CCM.P-K6. 'Draft B' report will be submitted shortly to KCDB through the President, CCM, BIPM.

The presentation of Dr Sam-yong Woo of KRISS (Korea) entitled "Development of differential pressure standard in KRISS" drew considerable attention, in particular, the blood pressure measurement using stimulator. Members felt that 'Health' was a very fast growing sector and needed greater efforts to meet the demand of the industry.

Dr Veera Tulasombut, NIMT, Thailand, presented the "Present Situation of Mechanical Labs of NIMT". He informed about the restoration of the quality system of their mechanical laboratories in the new building.

At the end of the Technical Workshop Dr John Man gave a presentation on APMF-2007 symposium on mass, force, torque and density held on 24-26 October 2007 in Sydney, Australia. A video on the next APMP meeting in Indonesia, 2008, was also shown.

The chairman Dr Bandyopadhyay then presented his report on the TCM. Aspects explained include:

CMC submission

- The APMP guideline for CMC entry APMP-G1 ver.4 is to be used for CMC submission. The submissions consist of the Excel workbook and necessary supporting information such as comparisons. If the laboratory has existing CMCs then modify the existing Excel spreadsheet.
- To obtain this Excel file, go first to the "Procedure for modifying CMCs already in Appendix C" (http://www.bipm.fr/en/committees/jc/jcrb/documents.html). From this procedure, click on the link to the "JCRB website" in Note 1 and then enter Login name (tcguest) and Password (tcontact) and click validate. To access the Excel file for your NMI, click "Get published CMCs", choose a metrology area, select country from the dropdown list, then click download. Alternatively, "Complete list of CMCs" gives access to CMCs submitted for review.

Comparisons

- The report for APMP.M.P-K6 can be completed after MSL and NMIA add sentences to the report explaining the 20 kPa result.
- The TCM approved allowing NML-SIRIM to be added to the already started APMP.M.P-K7.1.
- Dr Hitoshi Akimichi, NMIJ, is preparing the protocol for the vacuum comparison APMP.M.P-K9. NMIJ is currently looking at the stability of spinning rotor gauges.
- Dr Kobata, NMIJ, discussed an APMP 500 MPa comparison. About five countries at the meeting expressed interest. It was decided to wait until the CCM starts a 500 MPa key comparison and then follow with an APMP comparison.

The relationship between APMF and APMP TCM and whether they can be joined together, was also discussed.

The meeting ended with the concluding remarks and vote of thanks by Dr A.K. Bandyopadhyay.

Technology Network Meeting for Technology Development for Regional Transport Aircraft Programme (RTA 70)

A meeting of the directors and senior scientists of various laboratories/ institutes of CSIR, DRDO, and DAE was held on 29 February 2008 to discuss the technology needs of the Regional Transport Aircraft (RTA 70).

Welcoming the participants, Dr A. R. Upadhya, Director, National Aerospace Laboratories (NAL), Bangalore, described the genesis of the civil aviation programme at NAL, the efforts starting from the LCRA to product development associated with *HANSA* and *SARAS*. He informed that the Indian Air Force was interested in *SARAS* and an initial requirement of 15 aircraft had been received. An industry partner was being identified. Dr Kota Harinarayana had joined NAL as a Raja Ramanna Fellow and was spearheading the Regional Transport Aircraft project. Dr Upadhya mentioned that the spectacular growth in air traffic augurs well with the product development in the country as viability issues for civil aviation operations exist and it appears appropriate that aircraft with high level of efficiencies enabling lower operating costs will further promote civil aviation in the country. This could be achieved with the use of advanced technologies.

Dr Kota Harinarayana presented an overview of the Regional Transport Aircraft programme detailing the need for a new generation aircraft based on the market demand for an aircraft with low fuel burn, ownership and maintenance costs. Technologies required in the form of a laminar flow wing, hydrophobic coatings, use of low-cost composites, fly-by-wire controls, advanced avionics that will enable use of ill-equipped airfields, integrated vehicle health monitoring, etc. Presentations from NAL scientists and consultants from the RTA group followed. The aspects covered included: RTA aerodynamics, super hydrophobic coatings, morphing and the use of SMA for high lift devices and maintenance of civil aircraft. Presentations pertaining to airframes were on structural technologies requirements, use of piezo and SMA related smart materials for flutter and gust control, structural topology, structural health monitoring (SHM) and low-cost composites. Architectures for avionics, active noise control systems, flight control systems (fly by wire) and synthetic vision were described. Utility systems including ECS, all electric systems, etc. were also described.

Participants from the invited organizations described possible areas where collaborations and technology development networking were possible. Organizations represented by Directors and senior scientists from CSIO, IGCAR, ARCI, CMERI, RCI, NML, SERC, DMSRDE, R&D Engrs, CGCRI, AMPRI, CEERI, NPL, ADE, DARE, NID, CAIR, MTRDC, DMRL made short presentations on their expertise, interests and identified areas for technology development.

The Director NAL in his closing remarks thanked all the participants for showing their keenness to collaborate in the technology network. He asked them to send brief write up on possible contributions in near /medium terms to the project. He thanked the organizers of the meeting, the RTA group and KTMD for organization of the meeting.

Industry – Institute Interaction Meet at Kanpur

An industry interaction meeting was organized at Kanpur on 7 November 2007 with an intention to study, identify and find solutions to the regional problems of leather industry and also to discuss the XIth Five-Year Plan export targets. Dr K.V. Raghavan, Chairman, RC and Dr A.B. Mandal, Acting Director along with senior scientists from Central Leather Research Institute (CLRI), Chennai and RCED-Kanpur participated while the industry was represented by Mr Mukhtarul Amin, Chairman, CLE along with many industry representatives from Kanpur.

At the outset, Dr Raghavan, briefed the participants on the major objectives of the Indian leather programme to achieve an export target of 7 million US $ by the end of the 11th Five-Year Plan. Later, senior scientists from CLRI presented the latest technologies in leather processing, footwear

testing, and waste-water treatment. The need for developing specialized human resource for leather sector as a whole was also emphasized. These presentations were followed by interaction with industry representatives. The following specialized areas/facilities in the Kanpur region are being identified.

- Establishment of a testing laboratory for safety footwear,
- Design fashion studio,
- Implementation of eco-friendly and water saving leather processing
- Technology and modernization of existing CETP at Jajamau.

The industry representatives also requested CLRI to work closely and strengthen the existing leather technology group at HBTI, Kanpur. Dr A.B. Mandal assured the leather industry representatives of all possible technical support to develop the Kanpur based leather industry. Dr A. Garg, Scientist G & Head, RCED-Kanpur, co-ordinated this meeting.

Training programme on Intrapreneurship Development

The Human Resource Development Centre of CSIR (HRDC), Ghaziabad, and the FORE School of Management, New Delhi, jointly organized an Intrapreneurship Development Training Programme during 7-12 January 2008. Intrapreneurship is a newly coined word, meaning an enterprise entity within a corporate business structure, which, in all other sense, means the same as the entrepreneurship.

Dr Naresh Kumar of HRDC, in his inaugural speech, underlined the importance of 'Industrial' aspect of CSIR's charter and that CSIR would do all that it would take to keep pace with the emerging business culture and promote it. Dr S. N. Sharma of HRDC mentioned that CSIR is evolving a policy and had already issued an Office Memorandum to all the CSIR laboratories to initiate incubation centres as part of development activity.

The 22 personnel from various CSIR laboratories, who attended the programme, were divided into six groups to facilitate effective interaction and collective learning. The six-day programme comprised a series of lectures by management experts, Prof. A.K. Puri, Dr D. K. Batra, Dr Ravi Kumar, Dr Anita Lal, and Dr Vivek Kumar, from the FORE School of Management. Several case studies were presented and discussed. For example the case of Dr Amar Bose whose product 'Bose' speaker/amplifier system is one of the most admired one in the world. Dr Bose was at MIT, USA, when he launched his enterprise.

The series of lectures was educative in characterizing the entrepreneur, how important innovation is, the need for market research, understanding of financial aspects, etc. Smt. Sasikala G. R. Murthy (KTMD) of National Aerospace Laboratories (NAL), Bangalore, led the best team for collective learning and time management, as adjudged by Dr Anita Lal.

At the end, the groups presented their dream projects on Intrapreneurship. The dream project presentations on 'Selaero Flight Systems, Pvt. Ltd, product - A flexible personal aircraft' by Dr S. Selvarajan (C-CADD) *et al* and GAKS Aerospace Pvt. Ltd, product-customized composite aircraft components by Shri Ramasamy Setty (ACD) *et al* were adjudged as the first and second best proposals, respectively by Dr S. N. Sharma and Prof. A. K. Puri.

In participants' unanimous view, the laboratories would do well to embrace on CSIR's initiative in the formation of incubation centers for 'Intrapreneurs', as it would benefit growth of not only the laboratories but also their employees who have entrepreneurship potential.

CBRI celebrates Foundation Day

The Central Building Research Institute (CBRI), Roorkee, celebrated its Diamond Jubilee Foundation Day on 10 February 2008. The glittering function had Dr T. Ramasamy, Secretary, Department of Science & Technology, as the Guest of Honour and Maj. Gen. S.N. Mukherjee, Vice-Chancellor, Laxmibai National Institute of Physical Education, Gwalior, as Chief Guest. CBRI was established sixty years ago for conducting research in the field of buildings in general with special emphasis on indigenous materials and designing. Some of the major contributions made by the institute are utilization of industrial and agricultural wastes for building materials, disaster mitigation by developing techniques of building construction for regions prone to natural calamities and construction of Navodaya Vidyalayas in U.P. The institute has also rendered commendable service in the earthquake hit areas of Latur in Maharashtra, Uttarkashi and Chamoli in Uttarakhand and Bhuj in Gujarat by constructing low cost shelters and repairing damaged structures.

Release of the Biennial Report of CBRI

A recent achievement of the institute pertains to the development of a device of gravitational settling chambers for brick kilns to make them pollution free. Presiding over the function, CBRI Director Dr M.O. Garg pointed out that the institute has rendered yeoman's service to the nation by developing world class technology for cost-effective shelters for the people of low income groups in different geo-climatic regions of the country. On one hand, our scientists are engaged in finding most appropriate and economical solutions for housing for the poorest of the poor of the country, on the other, our expertise is being utilized for designing highly specialized structures for nuclear waste for the Bhabha Atomic Research Centre, Indira Gandhi Centre for Atomic Research, Metro Rails, etc.

The Guest of Honour Dr Ramasamy suggested that CBRI should also develop expertise in the areas like installation of early warning systems in Indian oceans, Tsunami hazard mapping and risk assessment. Formulation of guidelines for evacuation procedures and for construction in the coastal areas.

The Chief Guest Maj. Gen. S.N. Mukherjee congratulated the scientists for their pioneering efforts in developing building technology. He called upon them to work in future with greater zeal and vision.

The institute's Biennial Report was also released on this occasion. Dr B. Singh and Dr Manorama Gupta, Scientists, were honoured with the Diamond Jubilee Director's Award for development of know-how on natural fibre composite panel and door shutters. Various games had been organized during Diamond Jubilee year of CBRI, and the participants were awarded on this occasion.

Shri S.G. Dave, Chairman, Organizing Committee, proposed a vote of thanks. Dr Ashok Kumar Gupta, Senior Most Scientist, CBRI, introduced the Chief Guest and the Guest of Honour.

Conference on Landslide Management – Present Scenario & Future Directions

This three-day Diamond Jubilee Conference of the Central Building Research Institute (CBRI), Roorkee, was inaugurated on the eve of the institute's Foundation Day, i.e., 10 February 2008 by the chief guest Dr T. Ramasamy, Secretary, Department of Science & Technology, Government of India, New Delhi. Maj. Gen. S.N. Mukherjee, Vice Chancellor, Laxmibai University of Physical Education, Gwalior, graced the occasion as the Guest of Honour.

In his inaugural address, Dr Ramasamy deliberated on importance of research on landslide prediction. He stressed the need for preparation of vulnerability maps, scenario building. "Perhaps we could go back in time to about 100 years and sift through the available data to strengthen our database and modeling studies. Also, the hazard assessment and mitigation efforts should not be restricted to Tsunami alone, but cover all other coastal hazards where these data and models would find application," he opined.

General Mukherjee highlighted the services provided by the Army during landslide disasters.

Dr M.O. Garg, Director, CBRI, highlighted the contribution made by CBRI and the future challenges in the field of disaster mitigation. Dr Garg informed that the major areas of landslide research at the institute are landslide hazard mapping, slope stability assessment and stability analysis, landslide instrumentation and monitoring and control measures. With the advent of high tech instrumentation, space technology and fast computing techniques, frontier areas like remote sensing and GIS, geophysical investigation and landslide warning got supplemented with the traditional knowledge base. India is prone to many disasters – earthquakes, floods, landslides, cyclones and now the Tsunami. Earthquakes and landslides are the two major natural disasters in northern part of our country, particularly the Himalayas. Disaster mitigation and management, which includes landslides and earthquakes, is one of the major areas of research in which the institute has contributed significantly. CBRI being located in Uttarakhand, landslides and earthquakes are the two important disasters in which the institute has been working for more than two decades. The institute started working in the field of landslides in early eighties. Since then the scientists of CBRI have worked on all the important aspects of landslide research and contributed in this field in the form of national level projects and research publications.

Shri A. Ghosh, Scientist and Chairman, Organizing Committee, briefed about the conference and the Organizing Secretary Dr S. Sarkar, Scientist, presented a

Participants of the conference visiting the Mansa Devi site, Haridwar

glimpse of CBRI's work done in landslide research.

Fifty technical papers and seven keynote lectures were presented in the conference. Important areas such as hazard and risk mapping, remote sensing and GIS application, geotechnical studies, instrumentation, monitoring and warning, control measures, mathematical modeling and case histories were covered under seven thematic sessions which were well conducted by Dr D.P. Kanungo and Dr P.K.S. Chauhan.

In his keynote speech Dr R.K. Bhandari, Chairman, CDMM, VIT, Vellore and ex-Director, CBRI, emphasized the importance of landslide instrumentation and warning while Prof. G. Venkatachalam, IIT Bombay, delivered a talk on landslide hazard mapping through mathematical modeling. Prof. Yudhvir, ex-Professor, IIT Kanpur, spoke about the need of detailed geotechnical study.

The participants also visited Mansa Devi site, Haridwar where CBRI, Roorkee and CSIO, Chandigarh have jointly put their equipment for landslide studies. Besides the eminent research workers in the field of landslide research, the conference was attended by several others from various government and private organizations. Apart from the technical papers, a few corporate presentations from various private sectors were also made. The conference was basically aimed at creating awareness about the landslide disasters and providing a forum for policy makers, field engineers and research workers to share their views and experiences. It provided an opportunity to the participants to review the latest knowledge and exchange information and ideas in this field. The conference was supported by Department of Science & Technology and National Institute of Disaster Management, New Delhi, along with a few private corporates.

The concluding session was chaired by Dr A.K. Gupta, Seniormost Scientist and Head, Fire Research Division, CBRI. Dr B.R. Arora, Director, Wadia Institute of Himalayan Geology, Dehra Dun was the Chief Guest. Shri A. Ghosh, Scientist Co-ordinator, G.E. Division, proposed a vote of thanks.

CSIR Programme on Youth for Leadership in Science at NISCAIR

CSIR Programme on Youth for Leadership in Science was organized at National Institute of Science Communication and Information Resources (NISCAIR), New Delhi.

Held on 28-29 January 2008, the CPYLS at NISCAIR was attended by five meritorious students along with their parents. The programme was tailored to suit the interest indicated by the students, i.e. Information Technology, Physics, Mathematical Modelling, etc. Dr Amitava Sen Gupta, Scientist G, National Physical Laboratory, New Delhi, who was the Chief Guest on the occasion and Shri S.K. Rastogi, Acting Director, NISCAIR, inaugurated the programme.

Pursuing research in the domain of Time and Frequency Standard, Dr Sen Gupta is head of the QHRS (Quantum Hall Resistance Standards) project and has been to Antarctica three times — once as leader of the Indian Expedition. Delivering the keynote address, Dr Sen Gupta discussed his visits to Antarctica and Science Behind Atomic Clocks, through beautiful and informative slides. While delivering the illuminating lecture, he advised the students to work with full devotion and passion — that is key to success with pleasure, he pointed out.

Shri Rastogi pointed out that we are living in the era of Information and Communication Technology and highlighted the important role being played by NISCAIR in taking science to various target groups.

Earlier, in his welcome address, Dr B.C. Kashyap, Head, Popular Science Division and Coordinator of CPYLS, outlined the importance of Science in the economic and strategic growth of the nation and the objective of CPYLS.

Shri Pradip Banerjee, Scientist F and Head, Print and Production, proposed the vote of thanks.

The inaugural function was followed by the presentations by Shri Tarun Banerjee, Scientist F and Editor of *Indian Journal of Radio & Space Physics* on 'Networking Knowledge – Role of NISCAIR', in which he highlighted the major programmes of NISCAIR.

Ms Charu Verma, Scientist, IT Division, NISCAIR, gave a presentation on Information Technology

The participants were then taken round the Raw Material Herbarium and Museum (RMHD) by Dr H.B. Singh, Scientist F and Head RMHD. Shri Pradip Banerjee explained to the students the importance of Graphic Art and Design in S&T Information Communication.

On the second day Dr B.C. Kashyap gave a presentation on 'CSIR Contribution to Sustainable Growth of the Nation'. He highlighted the various S&T Human Resource Development Schemes of CSIR and contribution of CSIR to the various socio-economic and strategic sectors citing specific examples in Aerospace, Energy, Healthcare, Water, etc. He pointed out that at one time there was no institutional help but still we had great scientists such as Sir Raman, Bose and Saha, who worked for their passion for science. But today the country has a vast S&T infrastructure which not only

CPYLS at NISCAIR in progress

persues R&D but also supports it. He called upon the participating students to opt for Science for the rapid growth of the nation.

Shri H.J. Khan, Scientist and Editor, *Science Reporter,* gave a presentation on 'Popular Science Writing'.

Thanks to the invitation of Dr Sen Gupta, the students could be taken to the Time and Frequency Division of NPL where Dr Sen Gupta and his team explained to the students the working of the cesium clock and why do we need accurate time clocks.

From NPL, students were taken to the NISCAIR's SV Marg Campus. There Mrs Renu Arora, Scientist F and Head, Training, Ms V.V. Lakshmi, Scientist F and Head, National Science Digital Library and Shri Prakash Chand, Scientist F and Coordinator, E-Journal Consortium, made presentations on S&T information services/products, training programmes, etc. of NISCAIR. Mrs Renu Arora took the students around the various divisions of the SV Marg Campus. They were also taken round the National Science Library.

The valedictory function included a feedback session, and presentation of the certificates to the participating students by Shri Rastogi. All the participants rated the programme as Excellent and suggested that the programme should be of longer duration.

Indian Science Congress Award in New Biology to Dr G.A. Ravishankar

Dr G.A. Ravishankar receiving the ISC Award from Prof. P.R. Sudharkaran, Sectional President of New Biology, Indian Science Congress Association.

Dr G.A. Ravishankar, Scientist F and Head, Plant Cell Biotechnology Department, Central Food Technological Research Institute, Mysore, was conferred Prof. S.S. Katiyar Endowment Award in new Biology at the 95th Session of Indian Science Congress. His recent contribution to metabolic engineering and genomic studies related to secondary metabolites in plants, has been recognized by way of this award. Dr Ravishankar has also been adjudged one of the prolific investigators of SERC funded projects of DST as reported in *Current Science* 2007, 193(8), 1114-1120. He has published over 160 research papers in peer reviewed journals and also authored 40 reviews, 50 patents and guided 20 students for Ph.D. He is fellow of a number of Science Academies and Societies in India and abroad. He has also bagged Technology Awards given by Department of Biotechnology, Government of India and Association of Food Scientists and Technologists of India in the field of Plant Biotechnology and Food Biotechnology. His work is well supported by CSIR, DST, DBT and industries.

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