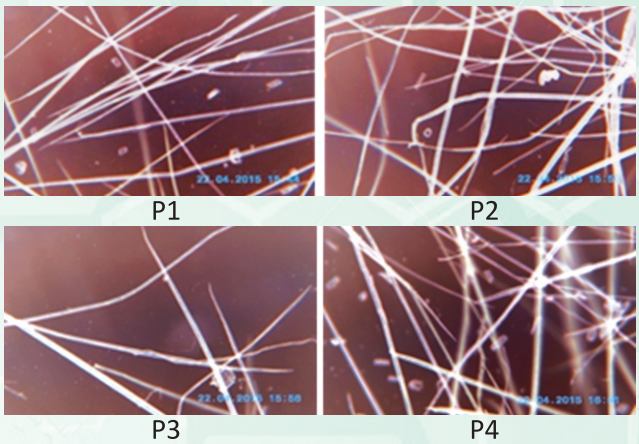
Polyol Pulping Parameters of Bamboo

Sl No	Solvent	Time (Min)	Pulp yield(%)	Kappa no	Viscosity (cp)
P1	Polyol	120	52.80	19.85	6.15
P2	Polyol [a]	120	43.00	16.85	6.96
P3	Polyol [b]	120	58.80	14.39	12.27
P4	Polyol [c]	120	22.65	21.34	2.10
P5	Kraft [d]	120	47.85	13.31	11.14

[a] +1% sodium hydroxide., [b] +1% sodium hydroxide and 1% Anthraquinone., [c] +1% (v/v) 0.1N hydrochloric acid., [d] + 12.75% sodium hydroxide and 4.25% sodium sulfide.



Microscopic view of pulp fibres sample obtained from polyol pulping

Project Title (Process part): Metal and metal oxide based nanoparticle assembled on iron oxide and oxy (hydroxide) for water purification.

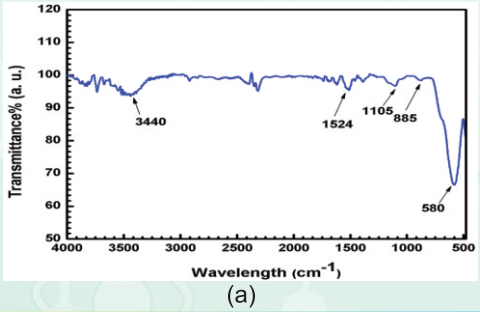
Project No: CSC-131

Funding Agency: CSIR

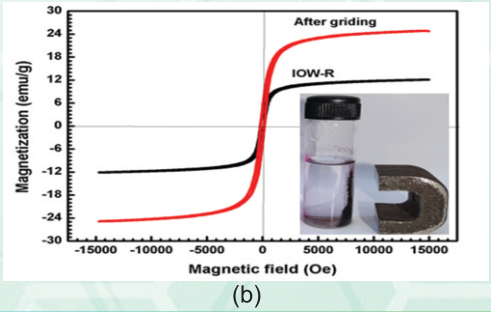
PI & Members: Dr Manash Ranjan Das (PI), Mr Tapas Das, Mr Om Prakkash Sahu, Ms Archana Yadav

Salient Achievements:

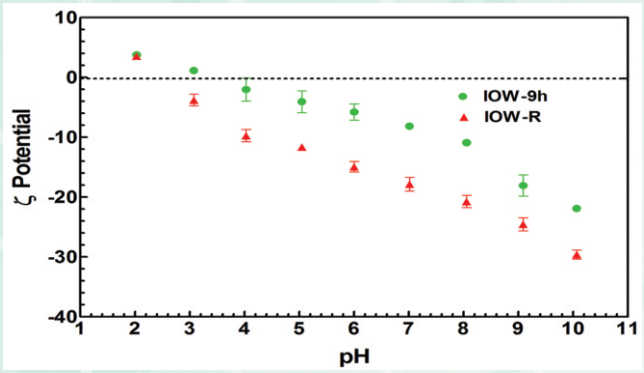
Waste iron oxide samples were ground in a planetary mill and the milling time and mill rotational speed were varied. The ground products were then collected at different time intervals such as 2 h (IOW-2h), 5 h (IOW-5h), 7 h (IOW-7h) and 9 h (IOW-9h) and characterized by different instrumental technique. Waste iron oxide nanopowder after grinding exhibits a typical weak ferromagnetic behavior with a saturation magnetization of 24.83 emu g^{1} which is found to be higher than that of waste iron oxide nanopowder before grinding i. e, 12.08 emu g^{1}. Zeta potential analysis of iron oxide waste bulk and iron oxide waste after 9 h grinding was investigated to understand the surface properties of these nanomaterials. Positive surface charges were observed at acidic pH and negative surface charges were investigated at basic pH.The isoelectric point of iron oxide waste after 9h grinding was achieved at pH 3.5 (Figure 1c). PL spectra determine the optical properties, migration of electron, electron–hole pair recombination rate and charge separation of the materials. The IOW-Rnanocomposite shows high PL intensities, which indicates high recombination rates of the excited electrons and holes due to smaller band gap energy of IOW-R compared to IOW-9h (Figure 1d).



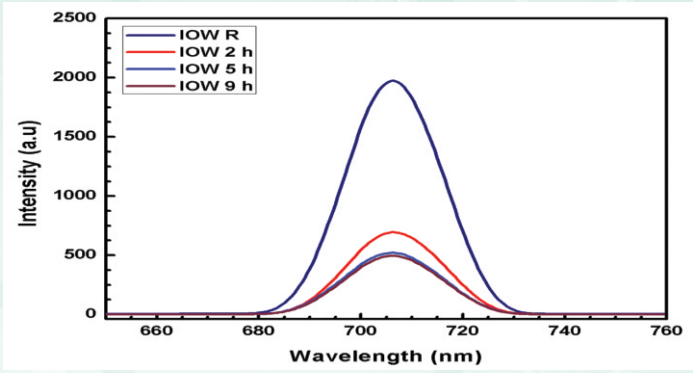
(a)



(b)



(c)

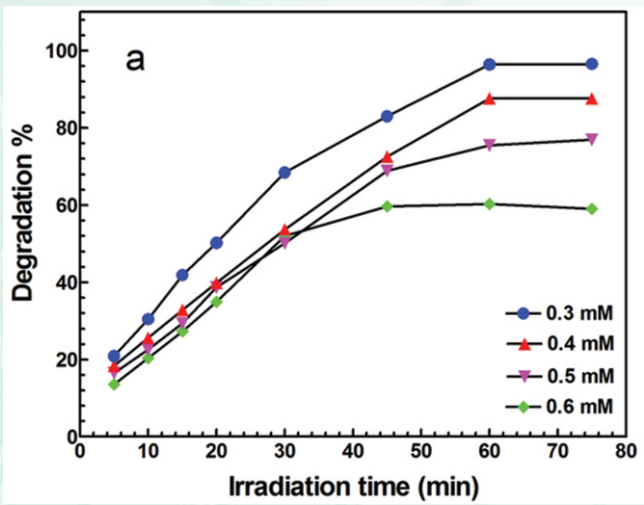


(d)

Isoelectric point = 3.5 (IOW-9h)

Figure 1. (a) FTIR (b) Vibrating Sample Magnetometer (c) Zeta potential and (d) photoluminescence spectral analysis of IOW nanopowder.

Photocatalytic degradation of Congo red and Rhodamine B using iron oxide waste nanopowder under sunlight irradiation: The photocatalytic degradation of Congo red (CR) and Rhodamine B (RhB) dye molecules was carried out using iron oxide waste nanopowder (IOW-9h) in the presence of natural sunlight sources. The degradation efficiency of iron oxide waste nanopowder was measured using UV-visible spectrophotometer at a wavelength of 498 nm for CR and 558 nm for RhB dye molecules.More than 96% dye degradation efficiency was investigated for both these dye molecules is represented in Figures 2(a, b).



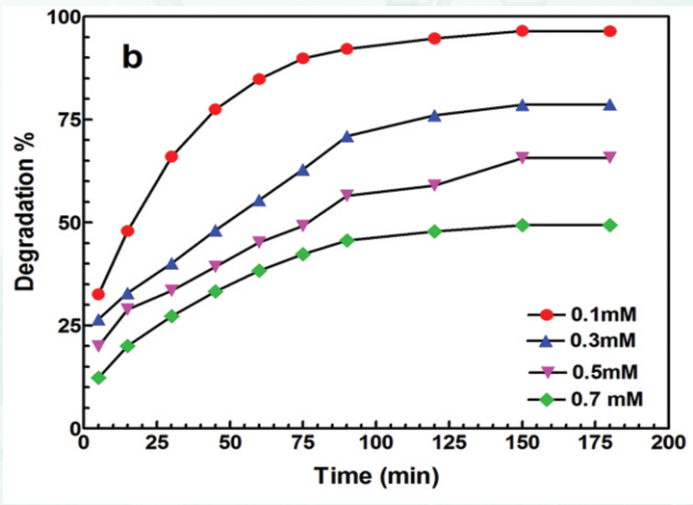


Figure : Percentage of the photocatalytic degradation of (a) CR and (b) RhB at different initial dye concentrations

Project Title: Speciality Materials Based On Engineered Clays (SPECS).

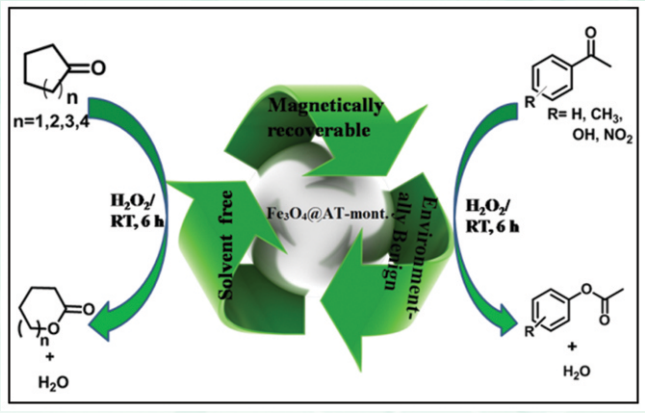
Project No: CSC-135

Funding Agency: CSIR

PI & Members: Dr Dipak Kumar Dutta (PI), Dr Lakshi Saikia, Dr Pinaki Sengupta

Salient Achievements:

Stabilized Fe_3O_4 magnetic nanoparticles into nanopores of modified montmorillonite clay: A highly efficient catalyst for Baeyer-Villiger oxidation under solvent free condition.



Fe_3O_4 magnetic nanoparticles (Fe_3O_4@AT-mont.) into the nanopores of modified montmorillonite clay has synthesized. Fe_3O_4@AT-mont. showed efficient catalytic activity for Baeyer–Villiger oxidation of various cyclic and aromatic ketones at room temperature and exhibited conversion of up to 98 %.

Project Title: Advanced Polyolefins.

Project No: CSC-206

Funding Agency: CSIR

PI & Members: Mr A Gautam (PI), Mr NC Laskar, Mr RC Bohra, Mr L Phukan

Salient Achievements:

PCL Microspheres using well-defined Polymeric Stabilizers:

The reaction parameters for the fabrication of polycaprolactone (PCL) and gelatin blended PCL microspheres was optimized. Poly (*n*-octadecyl methacrylate) and poly(*n*-octadecyl methacrylate-*co*-2-hydroxyethyl methacrylate) acts as *in situ* stabilizers in the synthesis of spherical, smooth and stable PCL microspheres in the range of 5-20 μm (Figure below).

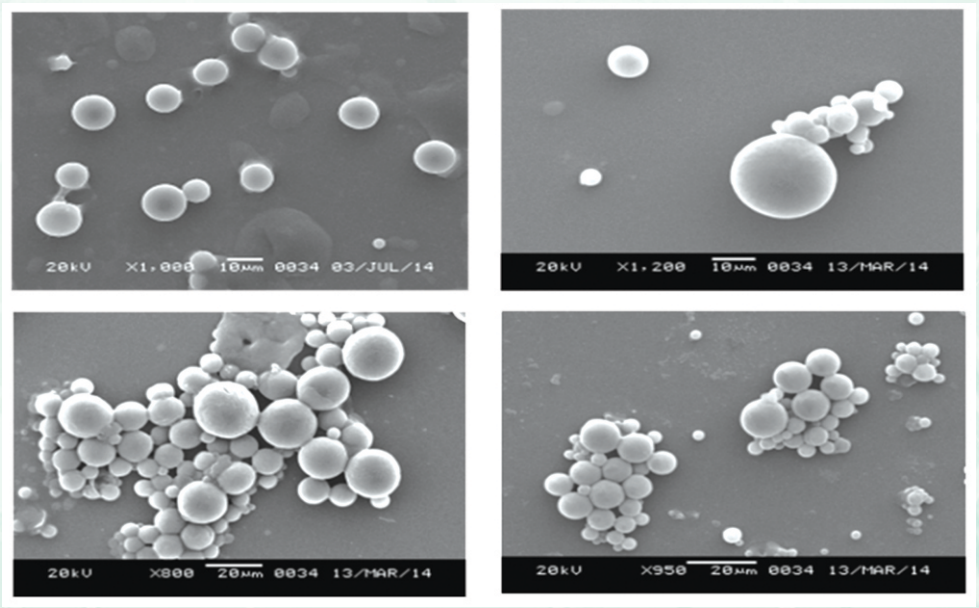


Figure: PCL Microspheres blended with Gelatin

Project Title: Probing the Changing Atmosphere and its Impact in Indo-Gangetic Plains (IGP) And Himalayan Regions (Acronym: AIM-IGP-Him).

Project No: PSC-112

Funding Agency: CSIR

PI & Members: Dr P Saikia (PI), Dr B K Saikia, Dr U N Gupta, Mr T Das

Salient Achievements:

The concentrations of polycyclic aromatic hydrocarbons (PAHs) associated with $PM_{2.5}$ and PM_{10} particles were used to investigate the air quality near two tea processing industrial units (Site A and Site B) that use high sulfur coal as their energy source. In the present investigation, a total of 16 PAHs (viz. Nap, Ace, Acen, Phe, Flu, Ant, Fluo, Pyr, BaA, Chry, BbF, BkF, BaP, DBahA, IP and BghiP) were measured. The source apportionment and distribution correlation of the individual PAHs were also performed at two different sampling sites. The total BaP_{eq}, which is the toxic equivalency factors based on the potency of benzo[a]pyrene (BaP) was also determined at the both sites. Aerosol sampling was also conducted in traffic area/commercial site at Jorhat city.

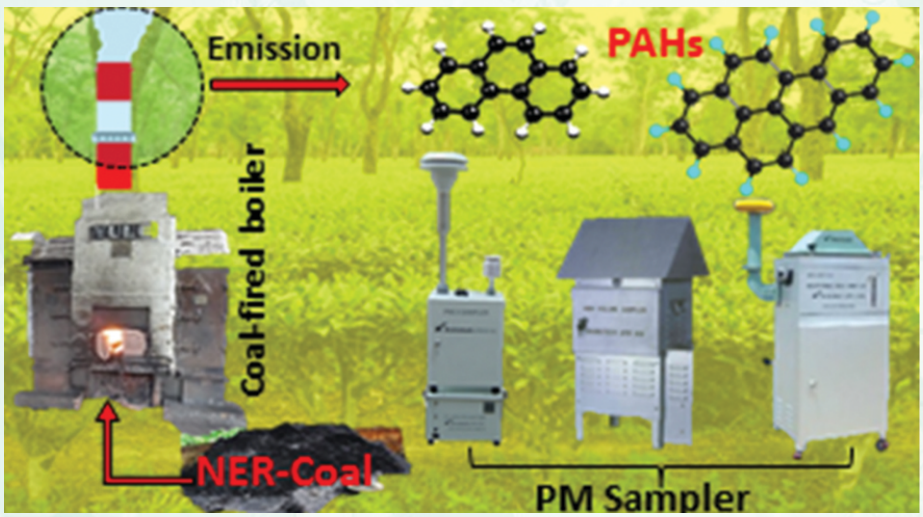


Figure: Graphical presentation of aerosol sampling around Tea processing plants using coal

(i) In-house, Grant in aid & Consultancy Projects

Project Title: Natural polymer based nanocomposites and biodegradable polymers (WP-IV).

Project No: MLP-3000/04

Funding Agency: CSIR

PI & Members: Mr A Gautam (PI), Mr NC Laskar, Mr A Sarmah, Mr RC Bohra, Mr L Phukan, Mr RK Baruah

Salient Achievements:

Poly(ethylene-*co*-butyl methacrylate) was prepared by concurrent ATRP/RAFT polymerization. Good agreement was observed between experimental and calculated activation energy (E_a) of copolymer decomposition *values*. The copolymer decomposition kinetic model was established (Figure below). Polymers exhibit significant bio-degradability.

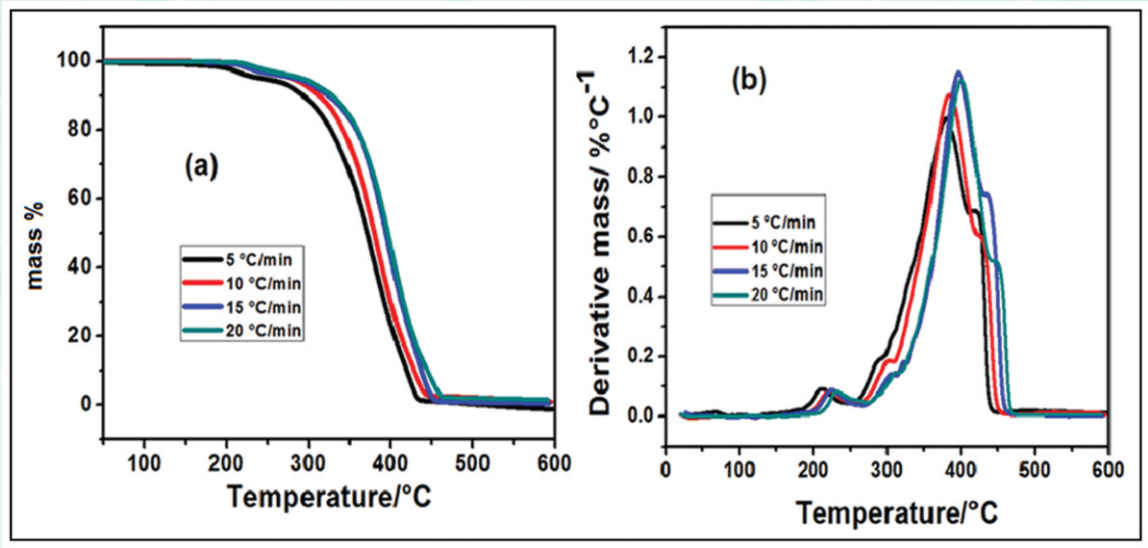


Figure: Thermal analysis of poly(ethylene-co-butyl methacrylate)

Project Title: Development of Efficient and Benign Catalysts and Catalysis.

Project No: MLP - 6000/1

Funding Agency: CSIR-New Delhi

PI & Members: Dr Dipak Kumar Dutta (PI), Dr Lakshi Saikia, Dr Pinaki Sengupta

Salient Achievements:

- Synthesis and characterization of metal complexes of functionalized phosphine and nitrogen donor ligands.
- Synthesis of mesoporous supports / stabilizers for generation of metal /metal oxide nanoparticles.
- Initial Catalytic Evaluation for hydrogenation and oxidation by synthesized catalysts.

Project Title: Bacterial adhesion on the metal oxides surfaces.

Project No: MLP - 6000/2

Funding Agency: CSIR-New Delhi

PI & Members: Dr ManashRanjan Das (PI)

Salient Achievements:

Fe_3O_4 nanopowders were synthesized adopting two procedures: top down (mechanical ball mill) and top up (co-precipitation) approach and were investigated towards adhesion of harmful gram negative bacteria *E. coli*. The adhesion of bacteria onto Fe_3O_4nanopowders were studied by adsorption study at different reaction conditions such as different concentration of adsorbate and adsorbent, pH of the reaction medium and temperature. Adsorption efficiency of about 97.67 % was obtained towards *E. coli* using Fe_3O_4nanopowders synthesized by ball milled process and 98.67 % adsorption efficiency was obtained for Fe_3O_4 nanopowders synthesized by solution chemistry approach. For the Fe_3O_4 nanopowders synthesized by ball milled process highest adsorption efficiency was obtained at pH 6 of the reaction medium at a temperature of 30°C and *E. coli* concentration of 0.1 gL^{-1}. On the other hand, 98.67 % adsorption efficiency was achieved under similar conditions at a temperature of 35°C. Different kinetic models and isotherm models were investigated for the adsorption study.

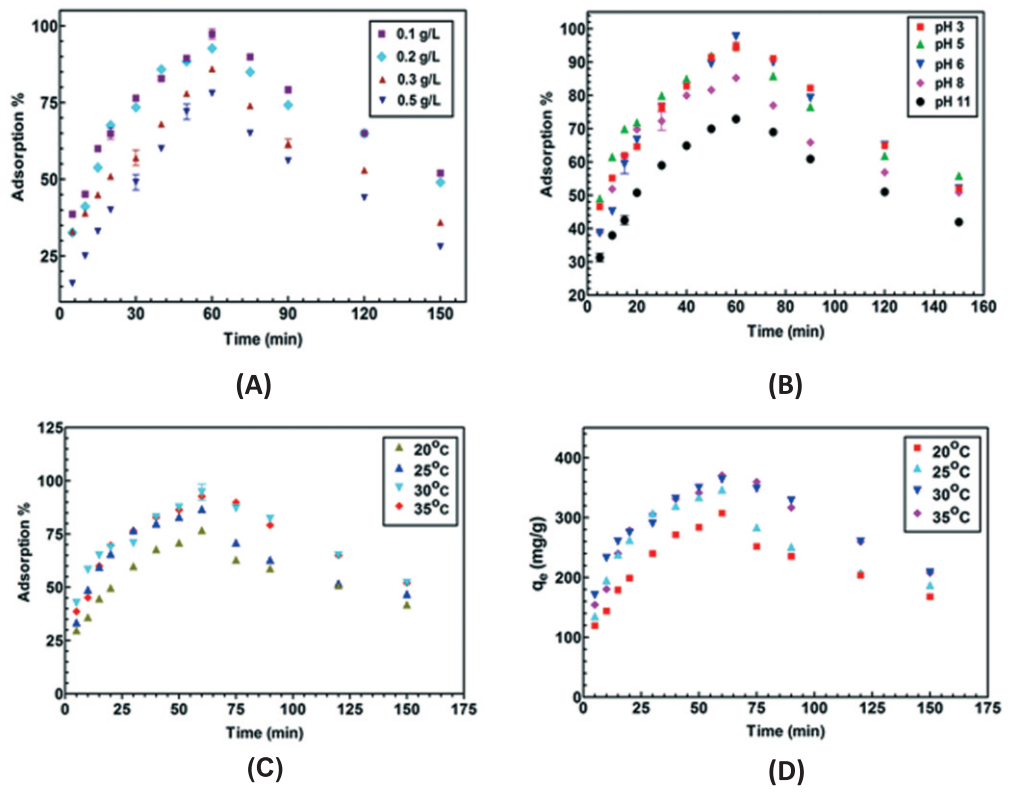


Figure : Adsorption study of E. coli onto Fe_3O_4nanopowder synthesized by mechanical ball mill process using (A) different concentration of E. coli (B) different pH condition (C) temperature (D) plot of $q_e$vs time

Project Title: Clean Coal Initiatives for North East Indian Coals (WP-III).

Project No: MLP-6000/03

Funding Agency: CSIR

PI & Members: Dr Binoy K Saikia (PI), Dr Upendra N Gupta, Dr Prasenjit Saikia, Mr Tonkeswar Das, Mr Pranjal Handique, Mr Hari C Dutta, Mr Pabon K Bora

Salient Achievements:

Petrological and biological studies on some fly and bottom ashes (CFA and CBA) collected at different times from an Indian coal-based captive power plant: environmental implications.

India has about a tenth of the world's coal reserves, much of it with high mineral content. These coals produce a large amount of fly ash, which can affect human health and environmental quality aspects during utilization. In this paper, the petrological and biological aspects of some industrially important Indian coal fly ash (CFA) from a coal-based captive power plant are addressed. The petrology of the CFAs is also studied for the samples collected in different times. The study has revealed that the CFAs contain mainly glass fragments, spinel, quartz, and other minerals in lesser quantities.

The deposition of CFAs over the leaves of different plant species reduces the photosynthesis rate by about 95% within a period of 2 hours (Figure below). The CFAs also show minor effects to some test microbes. This investigation will be useful in assessment of the environmental impact of a coal-based power plant in India.

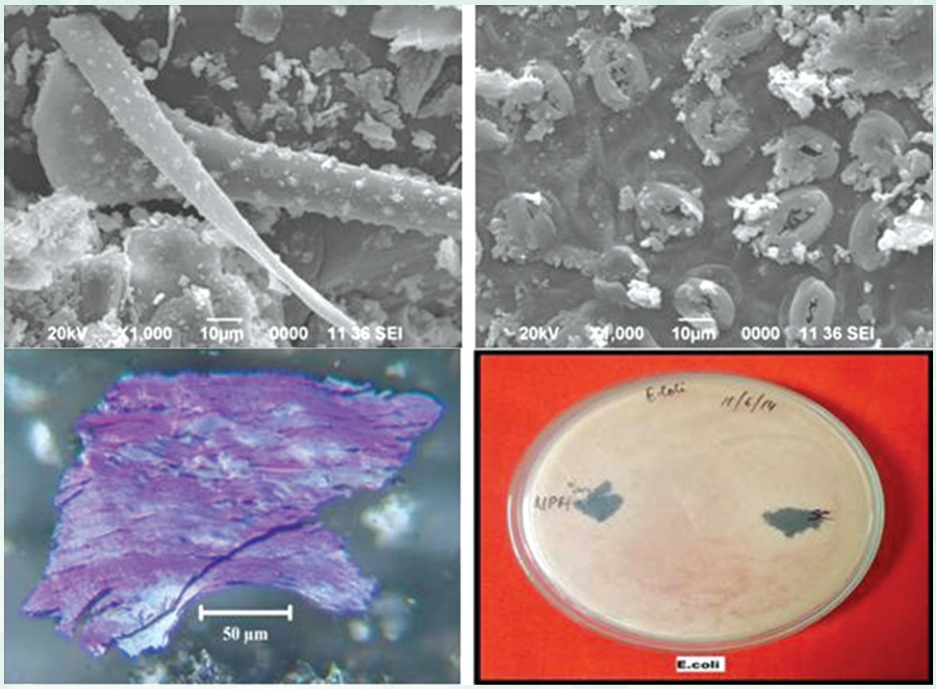
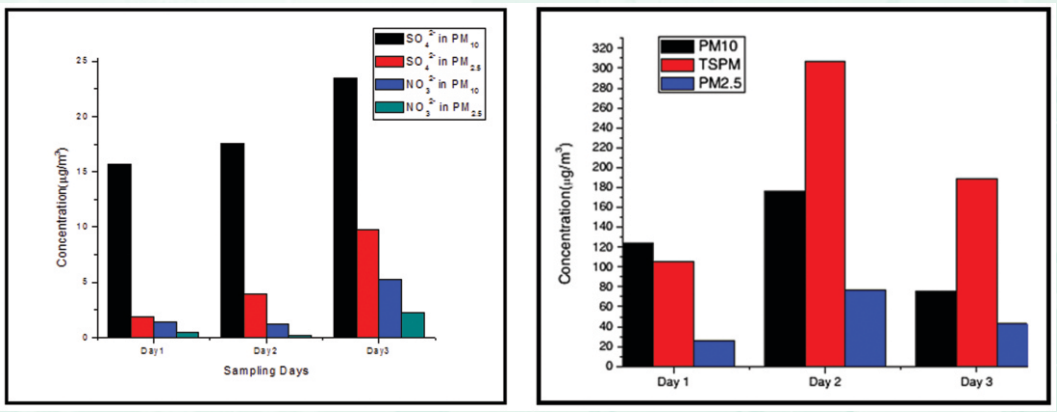


Figure: SEM micrographs (secondary electron images) showing blockage of stomata; anisotropic coke in bottom ash samples; strains with fly ash samples spotted (Fuel 2015, 158, 572-581)

Ambient air quality and emission characteristics in and around a non-recovery type coke oven using high sulphur NER coal:The concentrations of gaseous species (SO_2, NO_2, and NH_3) and aerosols ($PM_{2.5,}$ PM_{10}) in and around a non-recovery type coke making oven using high sulphur coals were investigated (Figure below). The concentrations of PM_{10}, $PM_{2.5}$ and SPM are relative higher than the limit of National Ambient Air Quality Standard of 24 hour. The particulate matters around the coke oven consist of fine particles with irregular in shape ranging in size of 2-2.3µm. The principal inorganic elements constituting these particles are Si, Fe, Ca, Cl, C, O, S and Al. The emissions of particulates (PM_{10} $PM_{2.5}$ and TSPM) show a positive correlation with the feed coal properties like VM, FC, C, and H.



(a) (b)

Figure: Air quality and concentration (µg/m3) of the particulate matter (PMs) around the coke oven using high sulfur coals (Science of The Total Environment, 2015, 530, 304-313)

A preliminary report on the formation of graphite from sub-bituminous coal during oxidation in H_2O_2/HCOOH: a new forecast

The formation of graphite during oxidation of a sub-bituminous NER coal sample by H_2O_2 and HCOOH in reflux condition at atmospheric pressure is reported. The oxidised coal sample was characterised by Fourier transformation infrared (FT-IR), X-ray diffraction (XRD), thermogravimetric analysis-differential thermal analysis-differential scanning calorimetry (TGA-DTA-DSC), X-ray photoelectron spectroscopy (XPS) and scanning electron microscopy (SEM) techniques, which revealed the oxidised coal (structurally modified coal) to be in graphitic form (Figure below).

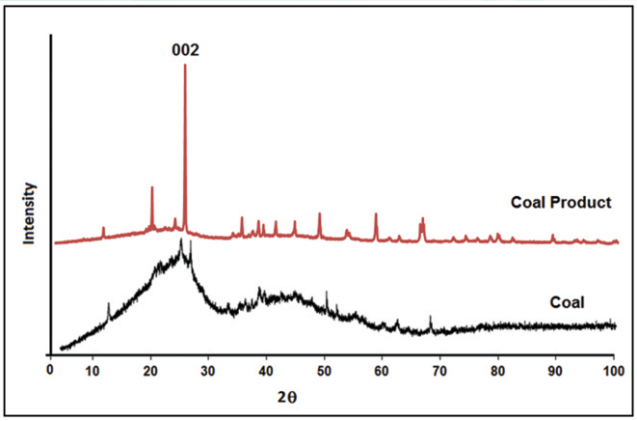


Figure: X-ray diffractogram of coal and oxidized coal product
(Int. J. of Oil, Gas & Coal Tech., 2016, in press)

Mineralogical and Elemental Analysis of Some High-Sulfur Indian Paleogene Coals: A Statistical Approach:The northeast (NE) region of India has a prominent reserve of Oligocene to Eocene coals of significant interest. An extensive study on the mineralogical and elemental composition of nine high-sulfur coal samples from the various Paleogene coalfields of the NE portion of India was conducted to understand the modes of occurrence and distribution patterns of the minerals, as well as the trace and rare-earth elements (REEs) in these coals (Figure below).

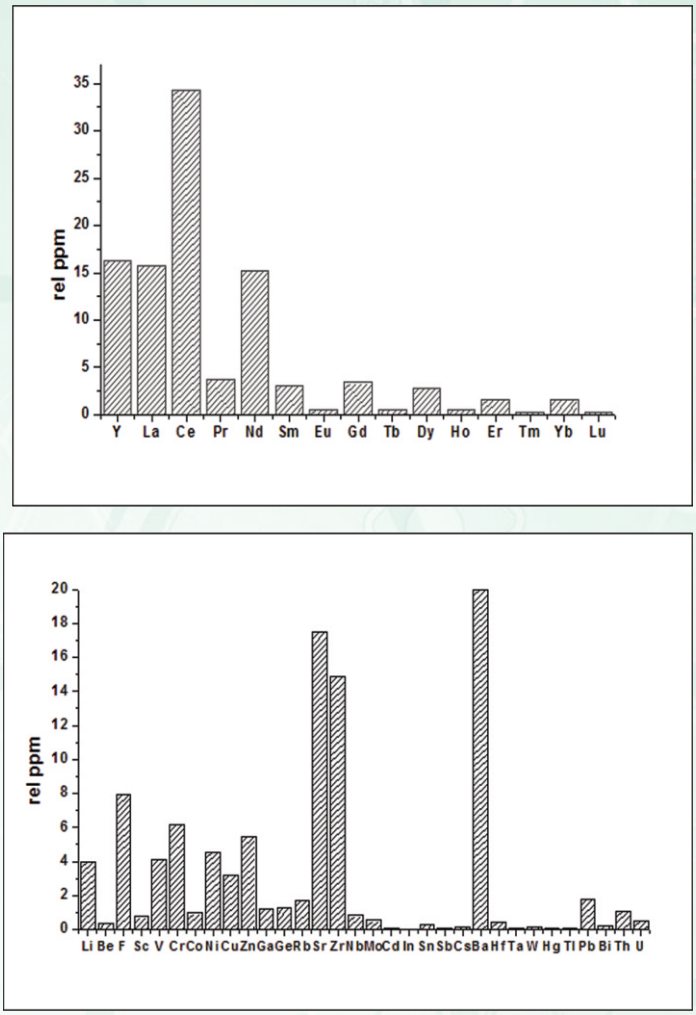


Figure: Relative concentrations in µg/g of various REY (first graph) and other elements (second graph).

A multi-analytical study on the sulphur components in some high sulphur Indian Tertiary coals :To better understand the distribution of sulphur containing components in high sulphur Tertiary coals, a multi-analytical analysis was carried out on four industrially important high sulphur northeast region (NER) Indian coals. It includes advance level characterization such as X-ray photoelectron spectroscopy (XPS), temperature-programmed reduction (TPR), Raman spectroscopy, Fourier transform infrared (FTIR) spectroscopy, X-ray diffraction (XRD), scanning electron microscopy (SEM), high-resolution transmission electron microscopy (HR-TEM) and Mössbauer spectroscopy techniques.

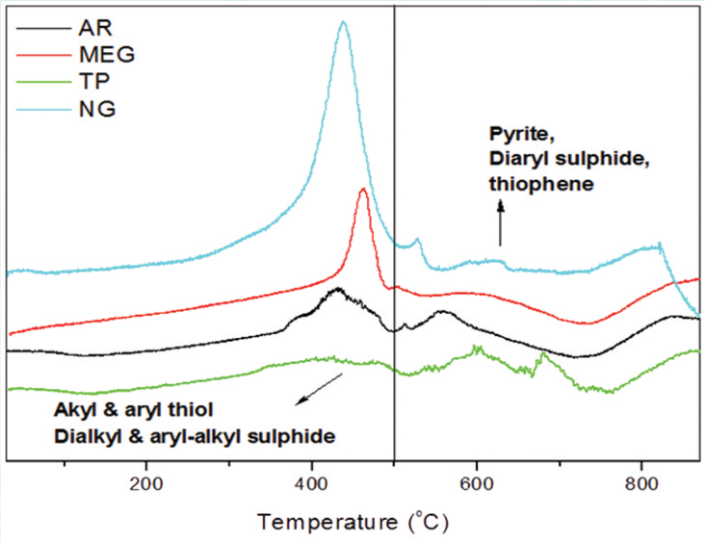


Figure: TPR spectra of the NER coals

Project Title: Sustainable development of high valued products and processes from lignocellulosic bio resources of North East India.

Project No: MLP- 6000/04

Funding Agency: CSIR, New Delhi

PI & Members: Dr T Goswami (PI), Dr D Kalita, Dr D Dutta, Ms Puspa K Das

Salient Achievements:

- A process for extraction of fibres from *Hibiscus sabdariffa* and *Cannabis sativa* suitable for making ropes, twines and fabric have been optimised and the physical strength properties of the extracted fibre have been determined.
- A technology for production of a bio formulation 'wood care' have been developed, which protect wood and bamboo from insect and fungus attack.
- Optimized the process parameters for making dispersible deodorant & freshener in large scale and the physical properties of the product were tested.
- An equipment has been designed and developed for production of dispersible deodorant in lab scale.

Project Title: Development of feasibility assessment model for adaptation of underground coal gasification technology in the North-East Region of India.

Project No: GPP-261

Funding Agency: Ministry of Communication and Information Technology

PI & Members: Dr PrasenjitSaikia (PI), Dr Binoy K Saikia, Mr Dileep K Dutta, Mr T Das

Salient Achievements:

Spalling behavior of NER Coal:

Spalling experiment was conducted for Tipong block coal sample. The post experimental observation shows that the coal sample has a tendency to spall, both in inert and reactive atmospheres with development of interconnected cracks. This significantly affects the gasification rate by offering higher surface area for reactions during the process.

Evaluation of Methane Estimation:

Coal Bed Methane (CBM), an important alternate

source of energy, depends upon the rank of the coal, depth of burial and geotectonic settings of the basins. Extraction of coal bed methane from un-mined coal beds in Northeast India is still in the initial stage. The qualitative and quantitative GC analyses of the residual gas content of NER coals obtained from desorption canister were determined along with the plots of the gas contents (voltage vs time). Gas-in-Place (GIP) is calculated as Constant x Volume where Constant = Density (in g/cc) × Gas content (in cc/g). The Total gas in place (GIP) equals the product of tonnage of coal and gas content per unit weight of coal.

Project Title: Small Community Level Low Cost Process From Local Biomass For Iron And Fluoride Removal From Bore Well Water Of Assam (LOCAL- MASS)

Project No: GPP-296

Funding Agency: Department of Science and Technology, New Delhi

PI & Members: Dr R L Goswamee (PI), Mr J J Bora (Co-PI), Mr Dipak Bordoloi, Mr Tobiul Husain Ahmed, Mrs Palakshi Bordoloi

Salient Achievements:

- Preparation of paddy husk ash, carbonised biomass and their surface functionalisation, surface modification by functionalised mass by oligomreric metal aquo species, grinding, sieving, washing of locally available cheap high silica minerals and preparation ceramic green and burnt pellets from these local materials to obtain Fluoride removing adsorbents.
- Study of permanent immobilization of spent adsorbents by fixing in cementitious matrix through different lime-silica reactions. Field Survey of some selected Fluoride affected areas of Golaghat, Nagaon and Karbi-Anglong district of Assam for installation of proposed defluoridation plant.

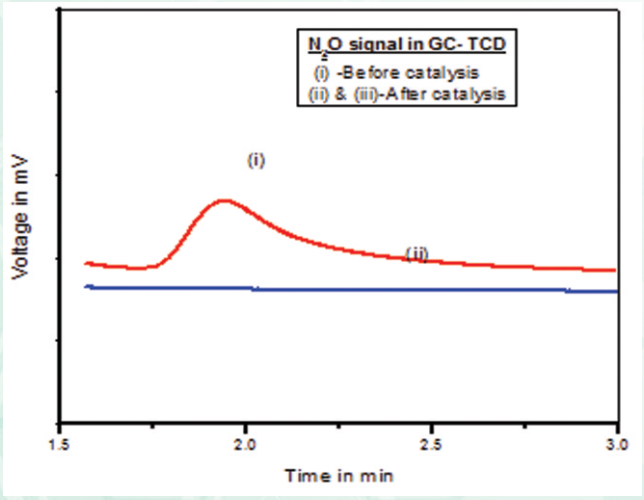
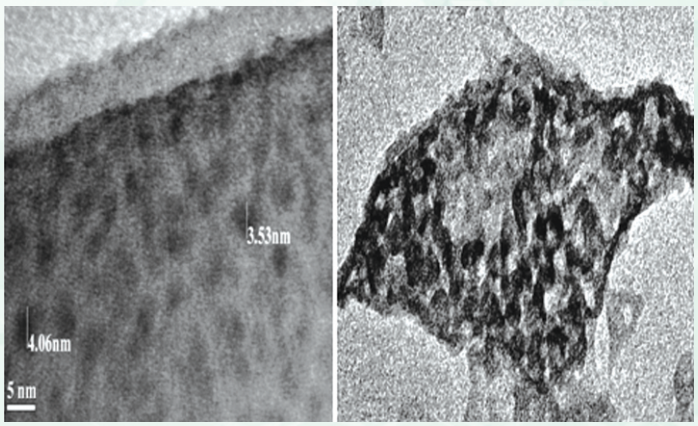


Fig : Chromatograms of (I) N_2O pre-mixed reactant gas (II) product gas after catalytic decomposition over silica@Mg-Al LDH core shell coated honey-comb at 450°C



A B

A - TEM images of nanoporous (A) Cu-Cr-diketocomplex (B) Zn-Cr-diketocomplex

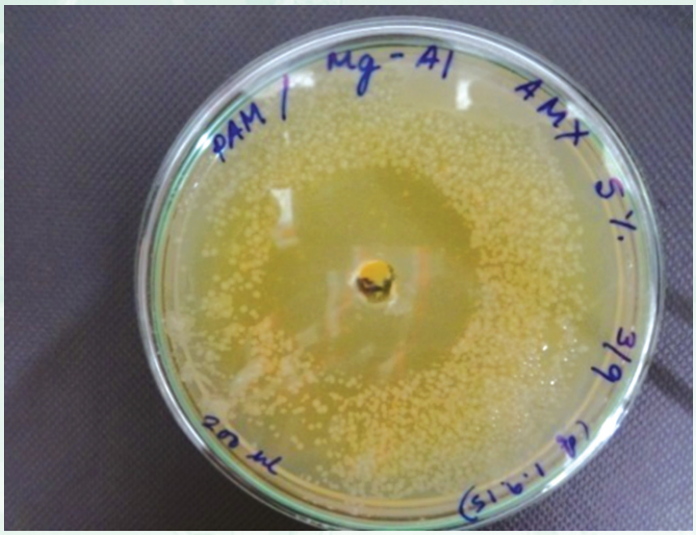


Fig.: Growth inhibition of *Escherichia coli* in 72 hours in polymer-Mg-Al-LDH-Amoxycillin hybrid media.

Composition of Hybrid Gel	Diameter of Inhibition Zone (mm)			
	Amoxycillin		Ampicillin	
	24 hour	72h	24h	72h
Ni-Al-LDH-Polymer	38	41	36	40
Mg-Al-LDH-Polymer	38	42	34	37
Distilled Water	38	38	36	36

Table – Antibiotic release behaviour of different hybrid gel composites and distilled water



Fig - A view of a multi-sectoral workshop on F and As in water involving affected community, state govt, NGO and different specilaised academic institutions



Fig.-Defluoridation assembly fabricated by MSME partner M/S Hydron (India) Dergaon



Fig Burnt Ceramic Filters Made out of Local Materials for Defluoridation of Water

SL NO	SOURCE OF WATER SAMPLE	FLUORIDE CONC (ppm)
1	Burapahar T. E.	4.81
2	Jagadamba T. E.	0.561
3	Dijoo Valley T. E.	2.46
4	KohoraTiniali	0.170

Table – Fluoride concentration in some bore well waters of Kaliabor-Kaziranga area (permissible limit BIS - 1.5 ppm, ICMR 1.00 ppm, US-PHS 0.8 ppm, WHO 0.5 ppm)

Management Sciences

Earlier, Management Sciences consisted of three major divisions namely, Human Resource Development Division, Information & Business Development Division and Planning & Project Monitoring Division. Each division had individual core activities to support the R&D fraternity of the Institute as well as to support the Director and Administration. This year, the three divisions were merged to form a new division named, Research Planning & Business Development Division (RPBD) with an aim to bring synergism in overall activities and objectives of the division. The divisional activities are being streamlined to ensure better performance with optimum use of resources.

RPBD will continue to work in areas focussed at developing business of the Institute, human resources, planning & allocation of resources and evaluation of outcomes of R&D projects. The division will continue to serve as a window to the outside world and maintain liaison with public, industrial houses, government & private agencies, entrepreneurs, etc.

In addition to that the Knowledge Resource Centre (KRC) and Information Communication technology division also provide significant and regular support to the Director and administration.

Information and Business Development Activities

Exhibitions/workshop organised:

The Information & Business Development (I&BD) group disseminated the institutional technologies through different exhibitions, through its products/posters etc. and invitation by the entrepreneurs in various occasion. The group also organised workshops/seminar etc.

Organised Students Visits:

Gyanjatra and Gyanjyoti programme:

During the year more than 3000 students from all over districts of Assam visited CSIR-NEIST under the Chief Ministers Gyanjyoti Programme, Govt. of Assam and more than 4000 Students under Gyanjatra programme frame by Inspector of Schools Jorhat, Golaghat and Sibsagar district.

Moreover Students from differents Universities, Colleges, Technical Institutes,& Schools of North Eastern Region visited CSIR-NEIST along with the guide teachers as a educational tour.



Mr Probin Baruah, Principal Technical Officer, interrecting with students and guide teachers

Publications:

During the period the division brought out the following regular and need based publications on different occasions.

- ***Annual Report 2014-15*** - Annual report of the institute was brought out and released on the 73rd CSIR Foundation Day celebration on 26 September 2015
- ***Highlights 2015-2016*** - Highlights 2015-16 of the institute (which is compilation of institutes activities) was brought out and released on the CSIR-NEIST Foundation Day celebration on 18 March 2016

- ***NEIST News*** *(Bimonthly newsletter)*
- ***INFOWATCH*** (*In-house Weekly*)



CSIR-NEIST Publications at a glance

Patents filing:

The group is responsible for processing of the institutes patent application for filing in India and abroad and for this is continuously coordinating with IPU, CSIR, New Delhi.

Processing of New Project Proposal:

The group is also responsible for processing of new project proposals. The proposals so received are forwarded to the respective committee for scrutiny.

Technology Transfer:

The group is responsible for the commercialization of the technologies developed by CSIR-NEIST. It is responsible for drafting of technology/knowhow transfer agreement and acts as bridge between the entrepreneur and the group responsible for demonstrating the knowhow package.

Testing & Analysis:

The group is also responsible for processing of the samples received by the institute for testing and analysis. The samples are sent to the respective division and on completion of the analysis, the reports received by the division are sent to the respective parties.

MoU/Agreement:

In addition to the MoU signed for technology/knowhow transfer, agreements were signed with various organization/universities for different purpose as given below:

Sl No.	MoA/MoU/Agreement	Purpose	Party	Date Of Signing
1	Agreement	Confidentiality Agreement on "Isolation and uses of natural dyes" developed by CSIR-NEIST, Jorhat	M/s Roha Dyechem Pvt Ltd, JJT house, Plot No. A/44-45, MIDC Andheri(E) Mumbai- 400093	06.04.15
2	Agreement	Confidentiality Agreement on "Anti Arthritis and Anti Fungi"developed by CSIR-NEIST, Jorhat	M/s Bordoloi Biotech, New Delhi, India	09.04.15
3	MoU	Collaborative Agreement	Assam Down-town University, Gandhinagar Panikhaiti, Guwahati-781026 Assam	11.05.15

4	Extension of MoA	Setting up and utilizing common facility centre(CFC) on weaving and textile products manufacturing	Society of North-East Handmade Paper Development (SNEHPAD), Cinnamara, Jorhat-06 Assam	25.05.15
5	Agreement	Knowhow transfer agreement on "Hydrocarbon-bioremediation using Hydrocarbonoclastic Bacteria"	M/s Better Technologies, 56 HSH complex, SOS road Borjhar, Guwahati-781015 Assam	21.12.15
6	Agreement	Confidentiality agreement on "vertical shaft klin technology of capacity 200 TPD for production of Portland Cement of BIS Quality"	M/s Bhairavi Infrastructure Pvt Ltd. Rajapara, P.O Singra Guwahati- 781135 Assam	04.01.16
7	Agreement	Confidentiality agreement on "Feasilibility study on high pressure catalytic conversion of Non-coking coals to produce synthetic coking coals"	TATA Steel Ltd, Jamshedpur-831001 Jharkhand	18.01.16
8	Joint Research Agreement	Feasilibility study on high pressure catalytic conversion of Non-coking coals to produce synthetic coking coals	TATA Steel Ltd, Jamshedpur-831001 Jharkhand	23.02.16

Human Resource Develpement Activities

The Human Resource Development (HRD) Group provides human resources and knowledge management solutions of the institute to realize the R&D output. To enhance the competencies of existing human resources of the institute the group imparts the training in and outside the country, organizes workshops / lecture seminars, etc. The group imparts training and motivates students of the NE region in particular and the country in general. The group undertakes extensive recordkeeping of the employee and researchers, competency development through need based training, strive for collaborative projects, etc.

Research Workers / Project Fellow:

The group encourages young talent for joining in the fellowships under various national and international schemes of CSIR and other funding bodies to carry out basic research in frontier areas of science from the country and from abroad. Presently, a few of them are

working in various capacity under such schemes viz., Women Scientist Scheme (WSS) of DST, Senior Research Fellow and Junior Research Fellow of CSIR, UGC and other funding bodies, DST Inspire fellow, CSIR-TWAS Fellow and Centre for International Co-operation in Science (CICS)'s Research Training Fellowships for Developing Country Scientists (RTFDCS). The group also arranges to engage a few lecturers / teachers of nearby colleges and other Institutes as Guest Workers for their research work leading to PhD. The number of such research workers under various capacity during the periods are enlisted viz., 19 Senior Research Fellow, 12 Junior Research Fellow, 02 Research Associates (CSIR & DBT), 03 Young Scientist Scheme (YSS), 01 Principal Investigator, DST Women Scientist Scheme, 04 CSIR-TWAS Fellow, 01 DST Inspire faculty and 01 TWAS-ROCASA, 01 DBT Ramalingaswami Re-entry fellow, 01 DST Ramanujan fellow, 156 Project workers. Based on review of their progress of research work a few of them were registered to pursue Ph D degree from Dibrugarh University, Gauhati University, Assam University and our own Academy of Scientific and Innovative Research (AcSIR).

Academy of Scientific and Innovative Research (AcSIR):

The group is the functionary unit of AcSIR in the Institute and has formulated and structured the activities of AcSIR.

Database Management:

The group maintains different databases on manpower of the institute viz., foreign visit of scientists, research workers, Ph D recipients, manpower, apprentice trainees, etc. The group provides information of Group IV scientist to RAB, to CSIR, visits of scientist abroad to ISTAD, CSIR.

Infrastructure Management:

The group manages different activities of the Boys' hostels, of the institute.

Project/dissertation to students:

The group arranges facilities for multi-theme and multi-level training programme viz., summer training, industrial training, practical training, dissertation, etc. for the selected students from different universities, colleges and institutes of the country up to a maximum period of six months.

Type of Project: Grant-in-aid

Project No: GPP-282

Project Title: **Motivational Programmes for School Students.**

Funding Agency: RVPSP, DST, New Delhi.

PI & Members: Dr Jatin Kalita (PI), Ms Kalyani Medhi (Coordinator), Mr Madhurjya Saikia

Objective:

The objective of the programme is to give the participants - selected bright students from high and higher secondary schools-- an exposure to the world of science in general, and the activities and achievements in science and technology in India. The programme will endeavour to inculcate in the participants a scientific temper and to encourage them to take up science in their career. Demystification of science and familiarization with the workings of the scientists are also proposed.

Salient Achievements:

The division has organized four one-day Motivational Programmes for Talented Students on 11, 12, 24 & 25 June 2015. One hundred eighty nine (189) students and nineteen (19) teacher guides from Jorhat Govt Boys' HS & MP School, Jorhat, Assam;Kuralguri HS School, Golaghat; N.N. Saikia College, Titabor, Jorhat; Concept Jr. college, Titabor; Luit valley Academy, Jorhat; Army Public School, Jorhat; Cresent Academy, Jorhat, KV, RRL, Jorhat; Jnanpith Academy, Jorhat;

Teok Girls' HS School, Teopk; DCB Girls' college, Jorhat and Jorhat Kendriya Mahavidyalaya, Kenduguri, joined the programmes. The day long programmes included two popular science talks, a semi-extempore speech competition on science topics among the students, and visit round the laboratory etc.

Type of Project: Grant-in-aid

Project No: GPP-297

Project Title: An investigation into intellectual property management practices at research institues and universities of NE India and preparation of a wish-list of technologies required for North East.

PI & Members: Mrs Alokananda Sengupta (PI)

Objective:

To identify and investigate:

- The IPM mechanism used in research institutes and universities of North East India.
- Problems and difficulties in implementation of IPM practices.
- To investigate the appropriate suitable technologies for the North East.

The findings of the above will be utilized to prepare two databases viz,

- A Database on IPM practices currently in use in research institutes and universities of North-East India.
- A wish list on the technologies required for the north eastern region.

Salient Achievements:

- LPAC has been formed.
- The questionnaire for collecting the data has been finalized.

Planning and Project Monitoring Activities

Planning and Project Monitoring (PPM) involves in the R&D management in terms of planning and allocation of resources and monitoring the outcomes of R&D projects. The Planning and Project Monitoring (PPM) group serve as the main centre for appropriate dissemination of information regarding Network projects (BSCs, CSCs, ESCs, ISCs, OSCs, PSCs, etc), Other Lab Projects (OLPs), Headquarter Controlled Projects (HCPs), Technology Leadership Projects (TLPs) and In-House projects (MLP, STS) as well as the other externally funded projects like (GAP, CNP, CLP and SSP) to the management and as well as the concerned scientists. The group provides proper logistic support to the management in respect of successful implementation and completion of the projects which reflects in the growth of the institute. The group also prepares the annual performance target of the projects and the laboratory as a whole by focusing the R&D thrust areas which are in accordance with the CSIR vision and National mission. The group also acts as a link between CSIR HQ and the Institute with respect to formulation of Planned Projects & their execution & regular monitoring and reporting of progress. The group is also entrusted with preparation of various documents such as Man-month distribution of projects, Task Assignment of staff, Manpower Profile, etc. The group updates the information of various projects and reports were prepared regularly for management support and other purposes. Processing of purchase indents and maintenance of Lab Notebooks are other activities of Planning and Project Monitoring (PPM) group.

Planning and Project Monitoring (PPM) group is actively involved on the following activities:

i. **External Cash Flow (ECF):** The Institute undertakes projects funded by various external agencies. The details of funds received from

these agencies were regularly recorded and monitored. Monthly statements of department wise ECF positions of the institute were prepared highlighting receipts from Govt Departments, Public and Private Organizations. Total ECF generated during 2015-16 was 746.97 lakhs which comprised receipts from Govt Depts/ Ministries, Public Sector Industries and Private Sector organizations to the extent of 94.85%, 3.65% and 1.5% respectively. ECF of the institute from different projects and services are shown below:

EXTERNAL CASH FLOW (ECF)
(Including Service Tax)

(Rs in Lakhs)

Sl. No	Category	Govt.	Indian Industry	*CPSE	**SPSE	Foreign Company	Foreign Agency	Others	Total 01/04/2015 To 31/03/2016
1	Collaborative	29.660	0.000	0.000	0.000	0.000	0.000	0.000	29.660
2	R&D Consultancy	0.000	0.100	0.000	23.105	0.000	0.000	0.000	23.105
3	Grant -in-aid	674.796	0.000	0.000	0.000	0.000	0.000	0.000	674.796
4	Premia	0.000	1.145	0.000	0.000	0.000	0.000	0.000	1.145
5	Royalty	0.000	0.047	0.000	0.000	0.000	0.000	0.000	0.047
6	Sponsored R&D	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7	Technical Service	4.078	9.982	2.800	1.346	0.000	0.000	0.000	18. 217
	Total:	708.534	11.174	2.800	24.451	0.000	0.000	0.000	746.97

* CPSE : Central Public Sector Enterprise
**SPSE : State Public Sector Enterprise

The division wise ECF are as follows:

Division	ECF(in Lakh)
Chemical Science and Technology	109.46
Geo -Science Science and Technology	368.30
Bio -logical Science and Technology	145.68
Material Science and Technology	46.99
Engineering Science and Technology	53.67
Extension Centres (Branch Laboratory	3.22
Itanagar & Branch Laboratory Imphal)	
Research Planning and Business	19.65
Development	
Total	**746.97**

ii. **Expenditure Monitoring:** The expenditure of all the projects were monitored as per the budget allocation and uploaded the details of receipt & expenditure in PPM portal so that the fund position of a given project is readily accessible by concerned PI and management for effective management. Planning and Project Monitoring (PPM) group facilitates in preparing Utilization Certificate and Statement of Expenditure of the externally funded projects.

iii. **Service Tax:** The Planning and Project Monitoring (PPM) group regularly carries out activities for the payment of service tax accrued from the various services rendered by the institute on monthly basis. Total Service Tax realized during the year 2015-2016 is Rs 8.97 Lakhs.

iv. **Project Status:** Status of Project Contracted and Completed during 2015-2016 are as follows:

Sl No.	Sources	Project Contracted		Project Completed	
	Project	Contract Value (Rs in Lakh)	No. of Projects	Contract Value (Rs in Lakh)	No. of Projects
1.	Grants-in-Aid	213.42	10	1131.81	16
2.	Collaborative	75.28	02	0.00	0
3.	Consultancy	35.01	01	0.00	0
Total		**323.71**	**13**	**1131.81**	**16**

v. **Audit Queries**: The group responds to various audit queries (ISO, Internal & External), Parliament queries and Rajya Sabha queries in relation to all type of projects. During the year 18 ISO, 03 internal (CSIR-Hq) and 31 external (CAG) audit queries were handled and replies were prepared.

vi. **Contribution to Lab Reserve Fund:** The group has taken initiative to transfer the overhead and Non-Refundable Balance amount of Rs 16.25 Lakhs from ongoing as well as closed Externally Funded Projects to LRF in the financial year 2015-2016.

vii. **Research Utilization Data:** Research Utilization Data deals with the revenue generated from the projects and other activities funded by external funding agencies undertaken by the institute. Yearly and quarterly reports were furnished to CSIR Headquarters regularly.

viii. **PPM Portal:** PPM group hosted and maintained a portal for display of all the project related reports on-line. The website is linked to the NEIST Intranet and at present displays reports on Projects-(Completed, on-going, in proposal stage), Research Utilization Data, External Cash Flow, Expenditure details of all ongoing funded and network projects, Service Tax, Employee List, Central Plan Scheme Monitoring System etc. Principal Investigators of projects can access and monitor on-line the expenditure incurred in their projects. For analysis of outcome of funded projects, the on-line form has been designed and the Principal Investigators are to fill it on completion of their projects. The reports available on-line have proved to be efficient technical support for the management and scientists.

ix. **Human Resource Portal:** The PPM group also hosted and maintained a portal to keep track of the manpower position in order to facilitate the

top management to formulate the policy on human resource requirement.

x. **ERP System:** CSIR has taken initiative to adopt Enterprise Resource Planning (ERP) system across all 38 CSIR institutes. CSIR-NEIST has constituted an ERP implementation team for successful implementation of ERP in the institute. PPM group is mainly involved in updating project related data and mapping of NEIST staff with the roles of the staff, in CSIR Enterprise Transformation Portal.

xi. **Monthly/ Quarterly Performance Report:** Monthly/ Quarterly Performance Report of NEIST contains information about the performance of the Institute on various parameters like papers, patents, development of technology, awards & appreciations received by scientists & staff members. Reports are regularly sent to CSIR Hq for their perusal. These reports also help the management in reviewing its own performance as a monitoring tool.

xii. **Man-month distribution of projects:** The manpower deployment in Network, in-house, Grant- in-aid, Sponsored and consultancy projects were analyzed and reviewed by PPM group. Resource requirements and utilization were reviewed. "Manpower profile of CSIR-NEIST" document was brought out for management purpose.

xiii. **Miscellaneous activities:**

a. The PPM group maintains the CSIR-NESIT Website and involved in regular Updation as and when required.

b. Form-16 for all income tax assesses were generated.

c. Lab Notebooks are indexed and maintained for future reference and intellectual property rights protection by the cell. During the year 43 nos. issued, 57 nos. returned & reissued.

d. The PPM group actively associated with the celebration of the CSIR Foundation Day on 26 September, 2015 and organized an essay and quiz competition on science topics among the staff of CSIR-NEIST & their wards.

e. The PPM group also involved in organizing the CSIR-NEIST Foundation Day celebration on 18th March every year.

f. Task assignment of staff members for 2015-2016.

g. Management of Annual Maintenance Contract (AMC) of 689 nos of computers and its peripheral under AMC and 80 nos of computers under warranty.

h. The PPM group also developed and maintained a website for 27th MRSI Symposium held in CSIR-NEIST during 18-25th Feb 2016.

Knowledge Resource Centre

The Knowledge Resource Centre (KRC) continued to provide library and information services to R&D division, Research Fellows, outside students and individuals like from universities of NE region and R&D institutes. The KRC also provides services to NEIST Branch Laboratory, Itanagar, Arunachal Pradesh and Imphal, Manipur. During the period the KRC added 87 books to its stock. It subscribes to 5 foreign and 38 Indian journals apart from subscription to Scifinder, SCOPUS, ACS journals, ASTM DL through NKRC. During the period, the KRC also collected Annual and other reports from various R&D and academic institutions.

The KRC continues to maintain database on publications and presentation of papers from the laboratory on the basis of which various reports with bibliometric analysis of laboratory's publications were carried out as and when required by the management. A data base on available Ph.D. thesis of NEIST, Jorhat was updated.

S&T Services & Facilities Installed



Shri Y S Chowdary, Hon'ble Minister of State for Ministry of Science & Technology and Earth Sciences, Govt. of India inaugurates the Essential Oil unit in presence of Shri Kamakhya P Tasa, Hon'ble Member of Parliament, Jorhat & Dr D Ramaiah, Director, CSIR-NEIST on 26 Jan, 2016.



Fig: Essential Oil unit



Foundation stone laying of Experimental Animal House by the Shri Y S Chowdary, Hon'ble Minister of State for Ministry of Science & Technology and Earth Sciences, Govt. of India on 26 Jan, 2016.



Padmasree Prof. J P Mittal, Professor, Bhaba Atomic Research Centre, Mumbai inaugurates Bio-Engineering Laboratory in presence of Dr D Ramaiah, Director, CSIR-NEIST on 55th CSIR-NEIST Foundation Day, 18 March, 2016.

Medicinal, Aromatic and Economic Plants Group



Fig: Herbarium is a repository of collections of dry and preserved plant specimens. A herbarium is newly constructed and inaugurated by Director, CSIR-NEIST at MAEP group under BSTD on 26.8.2015 at 10.30 AM in presence of scientists, staff members and students. The Herbarium is arranged as per Bentham & Hooker's system of classification (1862-1883) which contains nearly 1200 specimens of Angiosperm, Gymnosperm and Pteridophytes.

Cellulose Pulp and Paper Group



Fig: Solid Deodorant making equipment



Fig: Ozone Generator

Polymer Petroleum and Coal Chemistry Group



Fig: High Temperature Pressure Reactor (Amar Equipments)

General Engineering Group



Fig: Carbon and Sulphur Analyzer

Chemical Engineering Group



Fig:Electro Kinetic Analyzer

Advanced Materials Group



Fig: M/S Carl Zeiss make Field Emission Scanning Electron Microscope with EDS facility (FESEM with EDS)



Fig: M/S Milestone Italy model flex SYNTH state of the art microwave synthesis system which consists of a single microwave platform which in combination with specific accessories, allows classic glassware and high-pressure synthesis as well as solid-phase reactions. The advanced system has been installed for the first time in the country.

WORKSHOP/SEMINAR ORGANIZED

Seminar on EU-India cooperation opportunities in Research & Innovation





(Left): Host of dignitaries seen on the dais, (from right), Dr Marriane Jensen, Counselor-S&T, Royal Norwegian Embassy, New Delhi; Mr Arild Oksnevad, Counsellor, Head of Cooperation, Royal Norwegian Embassy, New Delhi; Mr Denis Dambois, First Counselor & Head of R&I, EU, New Delhi; Dr R C Boruah,Outstanding Scientist, CSIR-NEIST, Dr Vivek Dham, Advisor- R&I, EU, New Delhi and Mr Som Sekhar Ganguly, European Business & Technology Centre in India, Kolkata during the Program.

(Right): Mr Denis Dambois, First Counselor and Head of Research & Innovation, European Union, New Delhi speaking on "Horizon 2020 Framework Programme of European Union".

An awareness-raising and information seminar on "Research, Innovation and Higher Education Cooperation & Opportunities between India and European Union" was held at CSIR-NEIST on 27 April, 2015. Various important aspects on EU-India collaboration, R&I funding, higher education opportunities (Master/PhD/Post-Doc), mobility schemes/fellowships for Indian students and support services such as partner search tools were deliberated in the seminar.

CSIR-NEIST organized series of Science Motivational Programmes



Dr D Ramaiah, Director, CSIR-NEIST addressing the students in one of the programmes held.

With an objective to motivate students towards basic science, CSIR-NEIST organized four one-day science motivational programmes during 11-12 June and 24-25 June, 2015 at its premise. Altogether 183 students of class XII (science stream) along with 25 teachers from various schools of Jorhat district, Assam attended the programmes held.

CSIR-NEIST celebrated National Technology Day on 11 May, 2015



Shri P Padmanabhan, Managing Director, NRL, Numaligarh delivering the Technology Day Lecture as Chief Guest. Other dignitaries present in the dais are (from left), Dr R C Boruah, Outstanding Scientist, CSIR-NEIST; Dr D Ramaiah, Director, CSIR-NEIST and Dr N N Dutta, Chancellor, Assam down town University & Guest of Honour.

World Environment Day 2015 observed at CSIR-NEIST on 5 June, 2015



Dignitaries seated on the dais (from left), Prof B K Sarmah, Director, DBT-Centre, Assam Agricultural University, Jorhat & Chief Guest of the function; Dr D Ramaiah, Director, CSIR-NEIST; Dr R C Boruah, Outstanding Scientist, CSIR-NEIST & President- Assam Science Society, Jorhat branch and Dr D Dutta, Scientist, RFRI-Jorhat & Guest of Honour.

21st Dr J N Baruah Memorial Lecture held on 1 September, 2015





Left: Dignitaries on the dais (from left), Dr R K Bordoloi, Principal, DKD College; Prof Santanu Bhattacharyya, Director, Indian Association for the Cultivation of Science, Kolkata; Dr R C Boruah, President, Assam Science Society (Jorhat branch); Dr D Ramaiah, Director, CSIR-NEIST and Shri S R Medhi, Director, (Technical), NRL, Numaligarh

Right: Prof Bhattacharyya delivering the 21st Dr J N Baruah Memorial Lecture.

MRSI Symposium and 27th Annual General Meeting of MRSI



Materials Research Society of India (MRSI) Symposium on 'Advanced Materials for Sustainable Applications' and 27th Annual General Meeting of MRSI held at CSIR-NEIST during 18-21 February, 2016.

Short term Training on Computational Methods



Short term Training on Computational Methods for Receiver Function Analysis held at CSIR-NEIST during 16-22 November, 2015.

School Children Sensitization program on Seismic Hazard

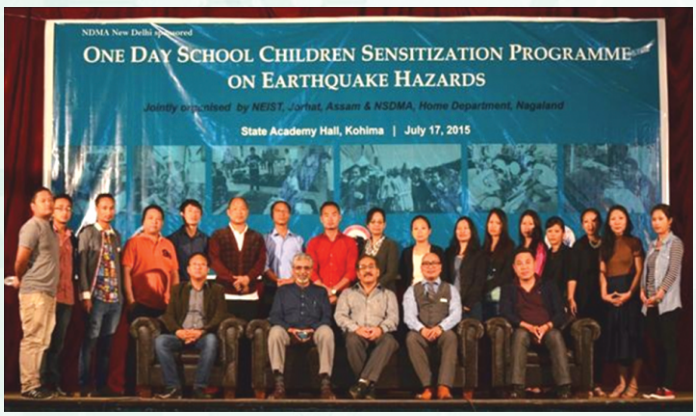




Fig: School children Sensitization workshop in Kohima and Shillong

School Children Sensitization program on Seismic Hazard was organized at three places of North East viz.; Kohima on 17 July, 2015 (nearly about ~ 1400 School Children attended), Shillong on 31 July, 2015 (Nearly about ~ 1200 School Children attended) and Itanagar on 30 September, 2015 (Nearly ~ about 1400 School Children attended) and other NE India state capitals were covered during 2015-16.

Seminar on Orchid culture held

One day seminar on "Orchid culture in North East India" was organized on August 31, 2015 at M S Iyenger Hall, CSIR-NEIST, Jorhat in the honor of superannuating Chief Scientist, Dr S C Nath, MAEP Group. Dr P K Borua, Professor, Life Sciences, Dibrugarh University attended the seminar as Chief Guest and delivered the seminar lecture. Dr D Ramaiah, Director, CSIR-NEIST presided over the programme and mentioned the necessity of the study on plant taxonomy in the region in his concluding remarks.

EVENTS ORGANISED

CSIR-NEIST observed 69th Independence Day on 15th August, 2015



Dr D Ramaiah, Director, CSIR-NEIST unfurling the Naional flag on 15 August, 2015 on the occasion of India's 69th Independence Day celebration at CSIR-NEIST and delivering his address on the occasion.

CSIR-NEIST observed State Mourning Day

At the instance of Government of Assam, the institute observed the State Mourning Day (Shok Diwas) on 17 August, 2015 along with the rest of the state in the memory of those killed in bomb blast on Independence Day (15 August, 2004) at Dhemaji under Lakhimpur district of Assam. A pledge taking function was held at Dr J N Baruah Auditorium in which the Dr D Ramaiah, Director, CSIR-NEIST administered the Shok Diwas pledge to members of the staff.

CSIR-NEIST observed Sadbhavana Diwas

The Institute observed 'Sadbhavana Diwas' on 20 August, 2015 along with the rest of the country. The day is observed every year to commemorate the Birth Anniversary of Late Prime Minister of India, Shri Rajiv Gandhi. Dr D Ramaiah, Director, CSIR-NEIST administered the Sadbhavana Diwas pledge to members of the staff.

Hindi Week observed during 7-14 September, 2015



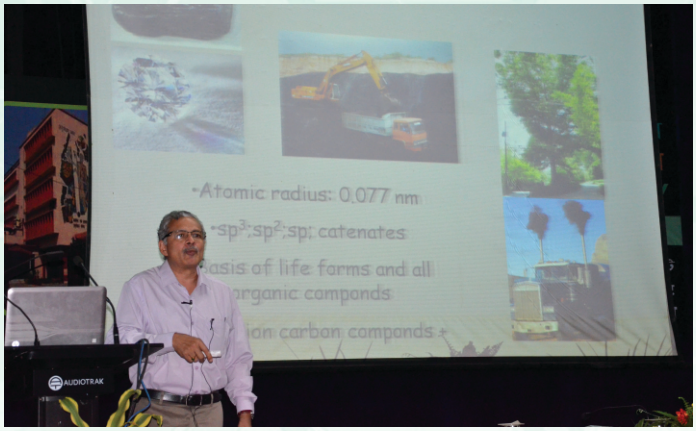
Air Commodore H Sahni, Air Force Hospital, Jorhat delivering his address as Chief Guest on the occasion of Hindi Diwas observed at CSIR-NEIST. Dignitaries present in the dais are (from right), Dr D Ramaiah, Director, CSIR-NEIST and Dr D Prajapati, Chief Scientist & Chairman, Official Language Implementation Committee, CSIR-NEIST.

Vigilance Awareness Week observed during 26-31 October, 2015



Dr D Ramaiah, Director, CSIR-NEIST delivering his address in the Valedictory function. Shri Vikram Singh, Administrative Officer, CSIR-NEIST, is seen seated on the dais.

73rd CSIR Foundation Day on 26 September, 2015





Left: Prof V Chandrasekhar, Director, National Institute of Science Education & Research, Bhubaneswar delivering the Foundation Day Lecture on 'Lord of the rings: The Rise of Carbon'. Right: Release of NEIST Annual Report 2014-15 by the dignitaries during the function.

National Integration Pledge taken

On the occasion of Communal Harmony Campaign and Fund Raising Week organized every year, the members of staff led by the Director, CSIR-NEIST took National Integration pledge on 19 November, 2015. As a fund raising gesture, the communal harmony sticker flags were also distributed on sale to all the staff members.

Director, CSIR-NEIST addresses staff on New Year





Dr D Ramaiah (Left), Director, CSIR-NEIST addressing the staff members on 1 January, 2016. Sri Ajay Kumar (right), In-charge-Hindi cell and Dr N C Baruah (Centre), Head- NPC Division are seen translating the speech in Hindi and Assamese respectively. CSIR-NEIST staff members attending the address.

67th Republic Day





Shri Y S Chowdary, Hon'ble Minister of State for Ministry of Science & Technology and Earth Sciences, Govt. of India is seen delivering the 67th Republic Day address. The celebration included Parade, unfurling of the flag followed by playing of National Anthem. Later various sport competitions were also held.

CSIR-NEIST Celebrated National Science Day on 29 February, 2016



From Left: Dr D Ramaiah, Director, CSIR-NEIST; Prof. Gautam Biswas, Director IIT, Guwahati as Chief Guest and Prof. Challa Vijaya Kumar; Professor, Univeristy of Connecticut, USA as Guest of Honour, during National Science Day Celebration held at CSIR-NEIST.

CSIR-NEIST Celebrated International Women's Day on 8 March, 2016



From Left: Ms Anuradha Sharma Pujari, Editor in Chief, Sadin and Saatsori as Chief Guest, Dr D Ramaiah, Director, CSIR-NEIST and Dr Aditi Bezbaruah, Assoc. Prof. & HOD, Physics, JEC, Jorhat as Guest of Honour during Women's Day Celebration held at CSIR-NEIST.

55th CSIR-NEIST Foundation Day on 18 March, 2016



Dr D Ramaiah, Director, CSIR-NEIST delivering his address in the CSIR-NEIST Foundation Day. Padmasree Prof. J P Mittal, Professor, Bhaba Atomic Research Centre, Mumbai as Chief Guest during CSIR-NEIST Foundation Day Celebration held at CSIR-NEIST.

Staff Club Activities:

Staff club members organised programmes viz., celebration of Bihu, Saraswati Puja, Sankardeva birth centenary etc. at CSIR-NEIST colony.

Exhibitions Organised





Left: CSIR-NEIST exhibition stall.

Right: CSIR-NEIST participated in the 23rd National Children Science Congress held at Jawahar Novodaya Vidyalaya, Titabor during 29 October - 1st November, 2015. Shri Basanta Das, Hon'ble Minister of State (Ind) Deptt.of Fisheries, Printing & Stationery and Information & Public Relation, Govt of Assam and Shri Solanki Vishal Vasant, IAS, Deputy Commissioner of Jorhat visited the exhibition.



Ms Harsimat Kaur Badal, Hon'ble Union Cabinet Minister of Food Processing, Govt. of India visited CSIR Exhibition Stall held at Veterinery College Ground, Guwahati on the occasion of Vibrant North East - 2016. CSIR-NEIST was the nodal lobatatory for organizing the exhibition during 18-20 Feb. 2016. Total 8 nos of CSIR laboratory participated on the occasion. The exhibition was jointly organized by Card, Assocham, Bsnl, Doner & Food Processing Ministry, Govt. Of India.