



DEPARTMENT OF BIOTECHNOLOGY
Indian Institute of Technology Guwahati
Guwahati 781039, India

ANNUAL REPORT
(1 APRIL 2006 – 31 MARCH 2007)

1) INTRODUCTION

Biotechnology continues to expand rapidly with new discoveries and often life-saving products at a breathtaking pace. This industry, a merger of science and business, demands a multi-disciplinary workforce skilled in basic-research, product development, regulatory affairs and commercialization. The Department of Biotechnology at the Indian Institute of Technology Guwahati started in year 2002 and offers students both Undergraduate (BTech) and Postgraduate (PhD) academic programmes. The department is unique in North-Eastern India, imparting quality education and providing an excellent research environment.

The major thrust of the department includes biochemical engineering, plant biotechnology, nano-biotechnology, computational biology and proteomics. The department has initiated efforts to establish advanced research laboratories in all the thrust areas. Apart from fundamental research, the goals of the department are also targeted to meet the demands of the biotechnology based industries.

2) ACADEMIC ACTIVITIES

The department is currently offering two programmes – B.Tech. and Ph.D. The B.Tech. degree offers comprehensive education in biotechnology focusing on basic concepts and techniques in biotechnology and allied engineering sciences. The programme consists of core and elective courses, seminars, summer training and a final year research project. The department also offers a Modern Biology course as a core subject to first year B.Tech. students of all disciplines.

The department offers research programme leading to the award of the Ph.D. degree in the following areas: Protein Folding and Aggregation; Computational molecular biophysics, structural-function-folding relationship, protein engineering, protein function, *In silico* drug design, Computer Simulation to study Drug-Resistance of HIV-protease, Enzyme and Microbial Technology; Plant Cell and Tissue Culture, Plant Genetic Engineering; Gene Therapy for Viral and Metabolic Diseases; Molecular Fingerprinting and Expression Systems in Food Grade bacteria; Biochemistry and Molecular Biology of Carbohydrate Enzymes; Fungal Biotechnology and Bio-pesticides, Biological Control of Insect Pests; Environmental bioremediation, Bioprocess development (upstream to downstream), Metabolic Engineering.

3) STUDENT IN TAKE

Ph.D. :

- a) Total number of Ph.D. students in the department : 25 (Regular -24, QIP-01)
- b) Number of Ph.D. students enrolled (Semester wise):
July semester: 08 (Regular -07, QIP-01)
January semester: 02

- c) Number of Ph.D. students received the degree: Nil

B.Tech. :

- d) Number of BT B.Tech students enrolled : 33
- e) Number of BT B.Tech students passed.: 16
- f) Placement/Higher studies of the outgoing students: Out of 19 B.Tech students (2003 batch = 18 & 2002 batch = 1) registered with placement cell IITG, 17 students have been placed in prestigious companies like Tata Consultancy Services Ltd, IBM Global Services (I) Pvt. Ltd, Global Analytics India Pvt. Ltd. Flextronics Software Systems etc Highest and lowest salary offered is 32.27 lakhs p.a and 2.7 lakhs p.a respectively. The average salary offered is 6.15 lakhs p.a. Many of the students are planning for higher studies in abroad and received offers from prestigious universities like Johns Hopkins, University of Pittsburgh, University of Southern California etc.

4) FACULTY STRENGTH

- a) Total faculty profile (Name, Designation, and area of interest in short)
Faculty strength as on March 31, 2007: 16 (Sixteen)
Assistant Professor : 13 (Thirteen)
Associate Professor : 3 (Three)

5) MAJOR EQUIPMENTS AND FACILITIES

The department has developed fully equipped B.Tech. Laboratories for Biochemistry, Microbiology, Molecular Biology and Plant Biotechnology. The department has procured major equipments like Super speed centrifuges, Ultracentrifuge, Inverted fluorescence microscopes, PCR machine, Steady state fluorimeter, UV-Visible thermostat control spectrophotometer, Ultrasonicator, Fermenters, Gel documentation system, Fraction collector, Cell disrupter, Atomic force microscope, HPLC, Tensiometer etc. In addition to that the department has created facilities like mammalian cell culture laboratory, transgenic greenhouse containment and biochemical engineering lab. The department of Biotechnology, IIT Guwahati, has a separate computational lab with the following facilities:

- a) *Desktop Computers*: 29 in number; Operating systems: Windows/Linux; Connected to Servers at the Institutional Computer Center by LAN.
- b) *Dedicated departmental Server for computational biology work*: 1 in number; Model: Atlas G710, ACER; Dual Intel Xenon Pcessor 3.2 GHz; Extended memory 64 technology; Hyperthreading; 800 MHz FSB chipset.
- c) *Dedicated departmental RISC Workstation*: 1 in number; Model: Sun Blade 2500, Sun Microsystems, with 2* 1.228 GHz Ultra SPARC Illi Processor.
- d) *Access to GARUDA grid of C-DAC*: Being a member institution of GARUDA grid, our department have access to this network and used for large scale computational biology works.
- e) *Software for computational Biology*: SYBYL modules (Tripos) – SYBYL Base, Biopolymer, Dynamic. These modules are used for molecular modeling and molecular dynamic simulations.

Apart from these facilities, each of the faculties is provided with personal desktop computers connected to the LAN.

6) RESEARCH & DEVELOPMENT ACTIVITIES

The department is committed to research in all aspects of biotechnology. Research projects sponsored by Department of Science and Technology (DST), Ministry of Human Resource and Development (MHRD), Council of Scientific and Industrial Research (CSIR), and Department of Biotechnology (DBT) are currently in progress. Twenty five Ph.D. students are pursuing research for their doctoral degree. The research in the department is carried out in diverse areas like Protein aggregation with emphasis on structural characteristics of aggregates and detection of protein aggregates in solution, Effect of macromolecular crowding on enzyme kinetics, structure-function-folding relationship of proteins, Biomaterials for drug delivery and tissue engineering, Development of redox and lipolytic enzymes for regio and enantio-selective synthesis of pharmaceutical compounds and development of biosensors and enzymatic biofuel cell; Genetic engineering of grain legumes for biotic and abiotic stress tolerance, marker free transgenic; Identification of plus trees and mass cultivation in biofuel plants; Segregation of abiotic stress genes in mapping population of rice; Phylogenetic analysis of emerging infectious viruses, Gene-therapy approaches for viral and metabolic diseases; Molecular fingerprinting of industrial food grade microorganisms, Identification of bioactive compounds from metagenomic library, Molecular analysis of carbohydrate enzymes; Biological control of insect pests, Plant tissue culture and biochemical analysis; Environmental bioremediation, Biohydrometallurgy; Bioprocess development (upstream to downstream), Bioreactor design and control, Metabolic engineering, Bioenergy; Computational Biology, In silico drug design; Biomolecule Immobilization, Biosensors, Analytical Biochemistry and Bioassays.

7) SPONSORED RESEARCH PROJECTS

NEW PROJECTS:

Title : Tracking the growth of soluble protein aggregates in real time using fluorescence and subsequent manoeuvres to inhibit their growth.

Investigator : Dr. R. Swaminathan

Sponsoring Agency : CSIR

Duration : 3 years

Title : Sleeping Beauty (SB) transposon mediated sequence specific delivery and activation of prodrug gene in hepatocellular carcinoma cells.

Investigator : Dr. S.S. Ghosh

Sponsoring Agency : CSIR

Duration : 3 years

Title : Synthesis of Biodegradable Nanocarriers for Targeted Drug Delivery.

Investigator : Dr. U. Bora

Co-Investigator : Dr. P. Goswami

Sponsoring Agency : DBT

Duration : 3 years

ONGOING PROJECTS:

Title : Genetic engineering of cowpea (*Vigna unguiculata* L. Walp) for storage pest resistance

Investigator : Dr. L.Sahoo

Sponsoring Agency : DST

Duration : 3 years

Title : Computer simulation to study drug resistance of HIV-Protease.

Investigator : Dr. Pradipta Bandyopadhyay

Sponsoring Agency : DST

Duration : 3 years

Title : Structural, functional and biochemical analyses of modular cellulases
Investigator : Dr. Arun Goyal
Sponsoring Agency : CSIR
Duration : 3 years

Title : Genetic evaluation and mass production of entomopathogenic fungi for development as a potent biopesticide.
Investigator : Dr. Gurvinder Kaur Saini
Sponsoring Agency : DST
Duration : 3 years

Title : Evaluation of *Beauveria bassiana* (Bals.) Vuill and *Metarhizium anisopliae* (Metsch.) Sorokin isolates for virulence, development of DNA markers and transformation studies.
Investigator : Dr Gurvinder Kaur Saini
Sponsoring agency : MHRD
Duration : 3.5 years

Title : In vitro morphogenesis and biochemical analysis of neem (*Azadirachta indica* A. Juss).
Investigator : Dr Rakhi Chaturvedi
Sponsoring Agency : DST
Duration : 3 years

Title : Collection of *Pongamia* germplasm from North Guwahati for identification of plus trees and mass cultivation in wasteland
Investigator : Dr. Latha Rangan
Sponsoring Agency : DST
Duration : 3 years

Title : Effect of NaCl on expression of translation initiation factor (eIF1) gene in leaf and roots of rice varieties and mapping of the gene in segregating populations.
Investigator : Dr. Latha Rangan
Sponsoring Agency : CSIR
Duration : 3 years

Title : Glucose sensor based on evanescent wave induced fluorescence spectroscopy
Investigator : Dr.Sunil Khijwania
Co-Investigator : Dr. Utpal Bora
Sponsoring Agency : BRNS, DAE,
Duration : 3 years

Title : Engineering nanoscale materials and their applications in nanotechnology
Investigator : Dr.Arun Chattopadhyay
Co-Investigator : Dr. S. S. Ghosh
Sponsoring Agency : DST
Duration : 3 years

***Title** : Development of micropropagation technology for large-scale cultivation of *Jatropha*: A potential biofuel plant
Investigator : Dr. L.Sahoo
Sponsoring Agency : NEDFI
Duration : 3 years

***Title** : Cloning of Elite Germplasm of *Jatropha* for Large Scale Plantation
Investigator : Dr. L.Sahoo
Sponsoring Agency : DARL
Duration : 2 years

*** Running from Center for Energy, IIT Guwahati.**

COMPLETED PROJECTS:

Title: : Signature gene mediated specific identification and molecular fingerprinting of industrial strains of lactic acid bacteria.

Investigator : Dr. A.Ramesh

Co-Investigator : Dr. S.S.Ghosh

Sponsoring Agency : MHRD

Duration : 2 years

Title : Construction of environmental library to access microbial diversity for identification of bioactive compounds.

Investigator : Dr. A.Ramesh

Co-Investigator : Dr. S.S.Ghosh & Dr. R.Swaminathan

Sponsoring Agency : DBT

Duration : 2 years

Title : Construction of a hybrid pro-drug-suicide gene transduction system.

Investigator : Dr. S.S.Ghosh

Co-Investigator : Dr. A.Ramesh

Sponsoring Agency : MHRD

Duration : 3 years

Title : Protein Folding: Looking for residual structures in denatured proteins.

Investigator : Dr. R.Swaminathan

Sponsoring Agency : Ministry of Human Resource Development (MHRD)

Duration : 3.5 years

Title : Studies on the metabolic machinery involved in the assimilation of alkane by filamentous fungi.

Investigator : Dr. P.Goswami

Sponsoring Agency : Department of Science and Technology (DST)

Duration : 3 years

8) CONSULTANCY : NIL

9) PUBLICATIONS

A. JOURNAL

INTERNATIONAL:

Ali Haider, M. and Pakshirajan, K. **(2007)** Screening and optimization of media constituents for enhancing lipolytic activity by a soil microorganism using statistically designed experiments. *Applied Biochemistry and Biotechnology*, (In press).

Bandyopadhyay, P.. **(2007)** Assessment of Two Surface Monte Carlo (TSMC) method to find stationary points of (H₂O)₁₅ and (H₂O)₂₀ clusters. *Theoretical Chemistry Accounts* (In press).

Dubey, V.K*, Pande, M., Singh, B.K., and Jagannadham M.V **(2007)**. Realm of Papain-Like Proteases: Applications of their Inhibitors. *Afr. Journal of Biotechnology* (In Press)

Pande, M., Dubey, V.K., and Jagannadham, M.V **(2007)**. Crystallization and preliminary x-ray analysis of cryptolepain: A novel glycosylated serine protease from *Cryptolepis buchanani*. *Acta Crystallographica Section F.*, F63, 74-77

Pakshirajan, K., Rene, E.R., and Swaminathan T. **(2007)** Decolourization of azo dye containing synthetic wastewater in a rotating biological contactor reactor: A factorial design study. *International Journal of Environment and Pollution*, (In press)

Saravanan, P., Pakshirajan, K. and Saha, P. **(2007)**. Growth kinetics of an indigenous mixed microbial consortium during phenol degradation in a batch reactor. *Bioresource Technology*, (In press).

- Vatsyayan , P., Kumar, A.K., Goswami, P and Goswami, P. **(2007)**. Broad substrate Cytochrome-P450-monooxygenase activity in the cells of *Aspergillus terreus* MTCC 6324. *Bioresource Technology* (In Press).
- Ghosh, S.S., Gopinath, P. and Ramesh, A. **(2006)**. Adenoviral vectors: A promising tool for Gene therapy. *Applied Biochemistry and Biotechnology* 133, 9-29.
- Gogoi, S., Gopinath P., Paul, A., Ramesh, A., Ghosh, S.S. and Chattopadhyay, A. **(2006)**. Green fluorescent protein-expressing *Escherichia coli* as a model system for investigating the antimicrobial activities of silver nanoparticles. *Langmuir* **22**, 9322-9328.
- Homchaudhuri, L., Kumar, S., and Swaminathan, R. **(2006)**. Slow aggregation of lysozyme in alkaline pH monitored in real time employing the fluorescence anisotropy of covalently labelled dansyl probe., *FEBS Letters*, 580, 2097-2101.
- Homchaudhuri, L., Sarma, N. and Swaminathan R. **(2006)**. Effect of crowding by dextrans and Ficolls on the rate of alkaline phosphatase catalysed hydrolysis: A size dependent investigation. *Biopolymers*, 83, 477-486.
- Kumar A. K., and Goswami, P. **(2006)**. Functional characterization of alcohol oxidase from *Aspergillus terreus* MTCC 6324. *Appl Microbiol Biotechnol.* 72, 906-911.
- Mahanty, B., Pakshirajan, K., and Dasu, V. V. **(2006)**. Production and Properties of a Biosurfactant Applied to Polycyclic Aromatic Hydrocarbon Solubilization. *Applied Biochemistry and Biotechnology*, 134, 129 – 142.
- Pande, M., Dubey, V.K., Yadav, S.C., and Jagannadham, M.V. **(2006)**. A Novel Serine Protease Cryptolepain, from *Cryptolepis buchanani*: Purification and Biochemical Characterization. *J Agric Food Chem.* 27, 10141-10150.
- Saikia, A.P., Ryakala, V.K., Sharma, P., Goswami, P. and Bora, U. **(2006)**. Ethnobotany of medicinal plants used by Assamese people for various skin ailments and cosmetics. *Journal of Ethnopharmacology*, 106, 149-157.

NATIONAL:

- Kumar, S. and Swaminathan, R. **(2007)** Employing the fluorescence anisotropy and quenching kinetics of tryptophan to hunt for residual structures in denatured proteins. *Journal of Chemical Sciences* (In Press)
- Bharali, S., Purama, R. K., Majumder, A., Carlos Fontes, C.M.G.A. and Goyal, A. **(2006)** Molecular characteristics of a novel, recombinant glycoside hydrolase of family 26 from *Clostridium thermocellum*. *Indian Journal of Microbiology* 46, 371-378.

B. CONFERENCE PROCEEDINGS

INTERNATIONAL: Nil

NATIONAL: Nil

C. OTHER PUBLICATIONS

BOOKS:

CHAPTERS:

- Goswami, P. **(2007)** Microbial Diversity and Bioprospecting in Biodiversity and Environmental Biotechnology, Edited by: P.D. Dwivedi, S.K. Dwivedi & M. C. Kalita, Scientific Publishers, Jodhpur, India pp 271-298 (In Press).
- Mitra, S., Badwal, S., Kelkar, U., and Latha R. **(2006)**. Climate Change and Vulnerability in Indian Agriculture: A Major Hurdle towards Food Security. Hazards and risk management in critical regions in Asia. Edited by R. B. Singh. 2006, pp. 275-287

10) a) PAPER PRESENTED IN CONFERENCES/WORKSHOP/SYMPOSIA

INTERNATIONAL:

- Bora, U., Sahu, A. and Goswami, P. (2007). Covalent Coupling of Protein Ligand to Biodegradable Nanoparticles for drug delivery. 2nd International Conference on Recent Advances in Composite Materials. New Delhi 20-23 Feb 2007
- Gopinath, P., and Ghosh, S.S. (2007). Cytosine deaminase as a prodrug/suicidal gene therapy system, 26th Annual Convention of Indian Association for Cancer Research (IACR) and International Symposium on Translational Research in Cancer, Bhubaneswar, 17-19 January 2007, Abstract No. A. 15, Page No. 95.
- Chatterjee, S., Barbora, L., Kumar, A.K., Goswami, P., Dutta, N.N., and Goswami, P. (2006). Purification, immobilization and application of a pseudomonas lipase for transesterification of lipid. *International Conference on "Bio-Fuel Vision 2015"*, Bikaner, Rajasthan, October 13-15 (2006). (Recipient of best paper presentation award).
- Chaturvedi, R., and Srivastava, P. (2006). Effect of casein hydrolysate (CH) on clonal propagation from nodal explants of an elite mature neem tree (*Azadirachta indica* A. Juss.). In: National conference on increasing forest productivity: genetic and breeding options, February 21-23, 2007. Genetics and Plant Propagation Division, Tropical Forest Research Institute, Indian Council of Forestry Research & Education, Jabalpur. Page No. 47
- Kesari, V., and Latha, R. (2006). *In vitro* propagation of potential biodiesel plant, *Pongamia pinnata* (L.) Pierre. International conference on biofuel vision 2015, Bikaner, India, October 13-15 2006.
- Latha, R., Srivastava, A.K., and Vogel, C., (2006). Consensus sequence and its significance in the sequenced genome of rice, *O. sativa*. 2nd International Rice Congress, New Delhi, India, October 9-14 2006, pp 103.
- Latha, R. (2006). Building public-private partnership in agricultural biotechnology. 4th International Symposium on Biotechnology and Biocontrol, Madurai, TN, India, Nov 27-29 2006, pp 174.
- Meher, B.R., Satish Kumar M.V. and Bandyopadhyay, P. (2006). Effect of simulation protocol and force-field on the flap dynamics of HIV-1 protease: presented in International conference on bioinformatics (INCOB) held in Delhi - December, 2006.
- Mishra, S.N., Latha, R. and Mitra, S (2006). Inventory of methane and nitrous oxide emission from agricultural soils of India: Assam as a case study. 2nd International Rice Congress, New Delhi, India, October 9-14 2006, pp 461.
- Pakshirajan K. and Swaminathan. T. Regeneration and reuse of a fungal biosorbent in removing heavy metals from wastewaters. Fourth international symposium on 'Southeast Asian Water Environment' December 6 - 8, 2006, Bangkok, Thailand, pp 269.
- Sahu, A. Goswami, P. and Bora, U. (2006). Microwave mediated rapid synthesis of chitosan from chitin. Indo-US symposium on Nanotechnology in Advanced Drug Delivery. NIPER Chandigarh October 5-6, 2006
- Sen, S., Venkata Dasu, V. and Mandal, B. (2006): Effect of physical process parameters on the production of alkaline protease from soil isolate - a statistical approach. Indian Chemical Engineering Congress, 59 the Annual Session, CHEMCON 2006 at Ankleshwar, Dec. 2006. India
- Vatsyayan, P., Kumar, A.K., Goswami, P. and Goswami, P. (2006). Cytochrome-P450-monoxygenase of *Aspergillus terreus* MTCC 6324, Presented in International Conference on Biomaterials (BIND-06) IIT Kanpur, 8-11 December 2006.

NATIONAL:

- Kumar A. K., and Goswami, P. (2007) Structure-function relationship studies of multimeric alcohol oxidases from *Aspergillus terreus* MTCC 6324. 11th ADNAT Convention: Advances in structural biology and structure prediction. 23-25th February 2007, P-40, pp 113
- Bharali, S., Purama, R.K., Majumder, A., Taylor, E., Davies, G.J, Fontes, C.M.G.A. and Goyal, A. (2007). Crystallization and 3-dimensional structure determination of a family 26 glycoside hydrolase of a bifunctional cellulase from *Clostridium thermocellum*. 36th National Seminar on Crystallography (NSC-36), January 22-24, 2007, University of Madras, Chennai, India, p1. ("3-Dimensional Structure of Lichenase enzyme of *Clostridium thermocellum*" was selected for Cover Page of Abstract Book)

- Bharali, S., Purama, R.K., Majumder, A., Fontes, C.M.G.A. and Goyal, A. (2006). Binding characteristics of family 11 Carbohydrate Binding Module (CBM11) from *Clostridium thermocellum*. 75th Annual Meeting of Society of Biological Chemists of India (SBCI), December 8-11, 2006, Jawahar Lal Nehru University, New Delhi, India.
- Bharali, S., Purama, R.K., Majumder, A., Fontes, C.M.G.A. and Goyal, A. (2006) Molecular characterization of a bifunctional cellulase of *Clostridium thermocellum*. 47th Annual Conference of Association of Microbiologists of India (AMI), December 6-8, 2006, University of Barkatullah, Bhopal, India, p174.
- Bharali, S., Purama, R.K., Majumder, A., Fontes, C.M.G.A. and Goyal, A. (2006) Biochemical properties of lichenan hydrolyzing family 26 glycoside hydrolase from *Clostridium thermocellum*. CARBO XXI, an ACCTI sponsored conference on "Recent Development in Carbohydrate Chemistry", November 26-29, 2006, University of Delhi, Delhi, India, pp30.
- Chaturvedi, R. (2006) *In vitro* haploid production: fast forward technique for improved crop production. National seminar on Biodiversity & Indigenous Knowledge System, October 25-26, 2006. Centre with Potential for Excellence in Biodiversity, Rajiv Gandhi University, Arunachal Pradesh. Page No. 19.
- Deka, D., Bharali, S., Javed, M., Fontes, C.M.G.A. and Goyal, A. (2006). Molecular cloning, expression and characterization of a bifunctional cellulase from *Clostridium thermocellum*. 75th Annual Meeting of Society of Biological Chemists of India (SBCI), December 8-11, 2006, Jawahar Lal Nehru University, New Delhi, India.
- Kumar, A.K., Vatsyayan, P. and Goswami, P (2006). Purification and specific functional characterization of alcohol oxidases from *Aspergillus terreus* MTCC 6324, 75th Annual Conference of SBC(I), JNU, New Delhi, 8-11 December 2006 Abstract No. P.I-114, page no 69.
- Mazumder, A. and Goyal, A. (2006). Optimization of conditions for production of dextransucrase, a glycoside hydrolase of family 70 from *Leuconostoc dextranicum* NRRL B-1146. 75th Annual Meeting of Society of Biological Chemists of India (SBCI), December 8-11, 2006, Jawahar Lal Nehru University, New Delhi, India.
- Mazumder, A. and Goyal, A. (2006) Purification of dextransucrase, a glycoside hydrolase of family 70 from *Leuconostoc dextranicum* NRRL B-1146 by polyethylene glycol. 47th Annual Conference of Association of Microbiologists of India (AMI), December 6-8, 2006, University of Barkatullah, Bhopal, India, p176.
- Mahanty, B., Pakshirajan K. and Dasu, V.V. (2006) Effect of glucose and triton X-100 on pyrene biodegradation by *Mycobacterium frederiksbergense* and *Mycobacterium vanbaalenii*: Burman design. 59th Annual session of Chemical Engineering Congress CHEMCON 2006' December 27 - 30, 2006, Gujarat, India, pp 10.
- Purama, R.K. and Goyal, A. (2006). Purification and characterization of a sucrose hydrolyzing enzyme from *Leuconostoc mesenteroides* NRRL B-640. 75th Annual Meeting of Society of Biological Chemists of India (SBCI), December 8-11, 2006, Jawahar Lal Nehru University, New Delhi, India.
- Purama, R.K. and Goyal, A. (2006) Production and purification of dextransucrase, a family 70 glycoside hydrolase from *Leuconostoc mesenteroides* NRRL B-640. 47th Annual Conference of Association of Microbiologists of India (AMI), December 6-8, 2006, University of Barkatullah, Bhopal (MP) India, pp191-192.
- Purukayastha, J., Sugla, T., Bakshi, S., Solleti, S. and Sahoo, L. (2006) Rapid *in vitro* plant regeneration from nodal explant of *Andrographis paniculata* Nees – a valuable medicinal plant. National seminar on Biodiversity & Indigenous Knowledge System, October 25-26, 2006. Centre with Potential for Excellence in Biodiversity, Rajiv Gandhi University, Arunachal Pradesh
- Saravanan, P., Pakshirajan K. and Saha. P.K. (2006) Modeling of phenol removal in a batch reactor using mixed culture. 59th Annual session of Chemical Engineering Congress 'CHEMCON 2006' December 27 - 30, 2006, Gujarat, India, pp 293.
- Sarma, T., Rangnekar, A., Ramesh, A. and Chattopadhyay, A. (2006). Enzymatic synthesis and corresponding functionalization of Au nanoparticles. Presented at Indo-Australian Symposium on Nanoscience and Nanotechnology. March 31 – April 1, 2006, Indian Institute of Science, Bangalore.
- Singh, G., Purama, R.K., Majumder, A., Dasu, V.V. and Goyal, A. (2006). Effect of pH and aeration on production of dextransucrase from *Leuconostoc mesenteroides* NRRL B-640 in batch and fed-batch fermentations 75th Annual Meeting of Society of Biological Chemists of India (SBCI), December 8-11, 2006, Jawahar Lal Nehru University, New Delhi, India.
- Uzma Mustafa and Gurvinder Kaur.(2006). Stress-tolerant entomopathogenic fungi : High affirmations for commercial market. 47th Annual conference of 'Association of Microbiologists of India', December 6-8, Barkatullah University, Bhopal. Page No.68.
- Vijayashankar, D., Damodar, R.A., Pakshirajan, K and Swaminathan, T. (2006) Decolourization of an azo dye containing synthetic wastewater using electrochemical oxidation technique. 59th Annual session of Chemical Engineering Congress CHEMCON 2006' December 27 - 30, 2006, Gujarat, India, pp 298.

Vatsyayan, P., Kumar, A.K., Goswami, P. and Goswami, P. (2006). Localization and broad substrate Cytochrome P450-monooxygenase activity in the cells of *Aspergillus terreus* MTCC 6324, 75th Annual Conference of SBC(I), JNU, New Delhi, 8-11 December 2006 Abstract No. P.I-115, page no 69

10) b). CONFERENCES/WORKSHOP/SYMPOSIA ATTENDED

INTERNATIONAL:

1. Dr. U. Bora: Indo-US symposium on Nanotechnology in Advanced Drug Delivery. NIPER Chandigarh October 5-6, 2006
2. Dr. K. Pakshirajan: 'Fourth International Symposium on Southeast Asian Water Environment' held during December 6 - 8, 2006 at Asian Institute of Technology, Bangkok in Thailand
3. Dr. L. Rangan: 2nd International Rice Congress, New Delhi, India, October 9-14 2006
4. Dr. L. Rangan: 4th International Symposium on Biotechnology and Biocontrol, Madurai, TN, India, Nov 27-29 2006.
5. Dr. Pradipta Bandyopadhyay. Practicing Chemistry with Theoretical Tools" held in Maui, USA.15-18th January, 2007.
6. Dr. V. Venkata Dasu: Participated in Short-term course on Cell Culture Technology, IIT-Bombay, Mumbai, India, Jan. 10-12, 2007
7. Dr. Arun Goyal: CARBOXXI, an Association of Carbohydrate Chemists and Technologists of India (ACCTI) sponsored conference on "Recent Development in Carbohydrate Chemistry", November 26-29, 2006, University of Delhi, Delhi, India.
8. Dr. Arun Goyal: .47th Annual Conference of Association of Microbiologists of India (AMI), December 6-8, 2006, University of Barkatullah, Bhopal (MP) India.
9. Dr. Arun Goyal: 75th Annual Meeting of Society of Biological Chemists of India (SBCI), December 8-11, 2006, Jawahar Lal Nehru University, New Delhi, India.

NATIONAL:

1. Dr. U. Bora: DBT Workshop on 'Biomaterials for Medical Devices and Drug Delivery on 17th February 2007 at IIT Delhi
2. Dr. U. Bora: 2nd International Conference on Recent Advances in Composite Materials. New Delhi 20-23 Feb 2007

11) INVITED LECTURES OF DEPARTMENTAL FACULTY:

1. Dr. P. Goswami. Foundation day talk at Institute of advance Studies in science &Technology (IASST), Guwahati, 3rd Nov. 2006. (Title: How to live longer?-A thought of Biochemists)
2. Dr. L. Sahoo: Invited speaker and resource person at National Workshop – cum – Exhibition on Bio-Diesel in North East, inaugurated by Hon'ble President of India at Guwahati, Assam, India, 17th – 19th Oct 2006 (Title of talk: Micropropagation Technology for Biofuel Plants)
3. Dr. L. Sahoo: Invited speaker and expert at Defence Agricultural Research Lab, Base Station, Haldwani for Workshop cum DARLs progress evaluation meeting on "Biotechnology for High Altitude Agriculture" held on 12-13th Nov 2006. (Title of talk: Genetic Engineering of Pulses for Biotic & Abiotic Stress Tolerance)
4. Dr. L. Sahoo: Invited speaker and resource person at National Workshop on Biofuel at National Institute for Rural Development, Khanapara, Guwahati, Assam. 27th – 29th Nov. 2006. (Title of talk: *In Vitro* Cloning of Biofuel Plants: Promise to Generate Commercial Scale Planting Material)
5. Dr. L. Rangan: Invited speaker at 2nd International Rice Congress, New Delhi, India, October 9-14 2006. (Title: Consensus sequence and its significance in the sequenced genome of rice, *O. sativa*)
6. Dr. L. Rangan: Invited speaker at 4th International Symposium on Biotechnology and Biocontrol, Madurai, TN, India, Nov 27-29 2006. (Title: Building public-private partnership in agricultural biotechnology)

7. Dr. L. Rangan: Speaker and Resource person for Regional seminar on IPR and Patents for Capacity Building, IIT, 15-17 September 2006. (Title: Introduction to Intellectual Property Rights.)
8. Dr. U Bora: Invited speaker at DBT Workshop on 'Biomaterials for Medical Devices and Drug Delivery on 17th February 2007 at IIT Delhi. (Title: Application of Photochemical Technology in Biomaterial Development: Current Status and Future Scope)
9. Dr. Pradipta Bandyopadhyay. Invited speaker. Practicing Chemistry with Theoretical Tools held at Maui, USA from 15-18th January, 2007. (Title: Enhanced conformational sampling of water clusters using 2-surface MonteCarlo method)
10. Dr. K. Pakshirajan: Delivered the two lectures: (a) Bioreaction Engineering and (b) Biocatalyst in Organic Chemical Synthesis in QIP-Short Term Course on "Green Chemistry-Green Technology" conducted during June 5 - 9, 2006 at Indian Institute of Technology Guwahati.
11. Dr. K. Pakshirajan: 'Regeneration and reuse of a fungal biosorbent in removing heavy metals from wastewaters' in the "Fourth International Symposium on Southeast Asian Water Environment" held during December 6 - 8, 2006 at Asian Institute of Technology, Bangkok in Thailand
12. Dr. Arun Goyal. "Molecular characterization of a bifunctional cellulase of *Clostridium thermocellum*". at 47th Annual Conference of Association of Microbiologists of India (AMI), December 6-8, 2006, University of Barkatullah, Bhopal (MP) India.

12) VISITORS FROM OTHER INSTITUTES/UNIVERSITIES :

1. Prof. Amitabha Chattopadhyay from Centre for Cellular and Molecular Biology, Hyderabad , 29-30th Nov 2006
2. Dr. Bhaswati Pandit from Dept of Pediatrics and Human Genetics The Center for Molecular Cardiology Mount Sinai School of Medicine NY, USA. 8th Dec. 2006
3. Dr U.S.N. Murty. Deputy, Director/Head Biology Division Indian Institute of Chemical Technology (CSIR) Hyderabad. 9th Nov. 2006
4. Dr. Debasis Dan, Indiana University, Bloomington, USA. 2nd Feb. 2007.
5. Mr. Kalyan Gayen, Dept. of Chemical Engineering, IIT Bombay. 25th Jan. 2007

13) SHORT-TERM COURSES : 2

1. Fundamental Techniques in rDNA Technology" at IITG held during 3-7 July 2006
2. MDONER sponsored short-term course on "Capacity Building for Micropropagation & Genetic Engineering of Biofuel Plants (at Center for Energy, 15th –20th Jan 2007)

14) SEMINARS/WORKSHOPS/CONFERENCES ORGANIZED : 2

1. Symposium on Entrepreneurship in Biotechnology: Scope & Prospects in North East India. Jointly organized by Department of Biotechnology, IIT Guwahati and North East Chamber of Commerce & Industry. Jan 20-21, 2007 at IIT, Guwahati.
2. Regional seminar organized under MHRD sponsored scheme on 'Awareness program on Intellectual Property Rights and Patents for Capacity Building' at IIT Guwahati 15-17 Septmeber 2006

15) INVITED LECTURES/VISITORS:

1. Prof. Amitabha Chattopadhyay from Centre for Cellular and Molecular Biology, Hyderabad - 29th and 30th Nov 2006 (Title of first talk on 29th Nov. 2006: Monitoring Organization and Dynamics of Membranes and Proteins using the Wavelength-Selective Fluorescence Approach. Title of second talk on 30th Nov. 2006: Interaction of the Serotonin_{1A} Receptor with Membrane Lipids: Implications in Receptor Function and Organization)
2. Dr. Bhaswati Pandit from Dept of Pediatrics and Human Genetics The Center for Molecular Cardiology Mount Sinai School of Medicine NY, USA. 8th Dec. 2006 (Title: Molecular Insights into Noonan Syndrome)
3. Dr U.S.N. Murty. Deputy, Director/Head Biology Division Indian Institute of Chemical Technology (CSIR) Hyderabad, 9th Nov. 2006 (Title: Integrated Information System for the control of Vector Borne Diseases)

4. Dr. Debasis Dan, Indiana University, Bloomington, USA. 2nd Feb. 2007 (Title: Identifying Core Promoter Elements in *Drosophila*)
5. Mr. Kalyan Gayen, Dept. of Chemical Engineering, IIT Bombay. 25th Jan. 2007 (Title: Evaluation of phenotypic space in metabolic networks using elementary modes).

16) PATENT FILED : NIL

17) AWARDS & HONOURS:

1. Dr. A. Goyal, has been conferred fellow of "Association of Microbiologists of India".
2. Dr. A. Goyal has appointed as Associate Editor, Indian Journal of Microbiology (AMI publication) Jan 2007.
3. Dr. A. Goyal has been appointed as reviewer, Journal of Food Biochemistry, from UC Davis, California, USA, (Blackwell Publishers), since 2006
4. Partial financial grant awarded to P. Bandyopadhyay to attend an international conference honoring Prof. Mark Gordon to be held in USA in January, 2007 from three agencies, namely (a) DST (b) CSIR and (c) INSA
5. Dr. Pradipta Bandyopadhyay included for inclusion in Marquis WHO'S WHO IN SCIENCE and ENGINEERING 2006-2007.
6. Dr. Vikash Kumar Dubey nominated as editorial board member of "Biotechnology and Molecular Biology Reviews" (<http://www.academicjournals.org/bmbr>) starting from 1 January 07

18) ANY OTHERS (SPECIAL MENTION) : NIL

19) FACULTY MEMBERS ALONG WITH PhD, DESIGNATION, AND AREAS OF INTEREST

Dr Pranab Goswami

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Biocatalysis biosensor, enzymatic biofuel cell and biotransformation.
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Dr Rajaram Swaminathan

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Protein Structure, Folding and Aggregation, Effects of Macromolecular crowding on physiological media.
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Dr Arun Goyal

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Dr Lingaraj Sahoo

Assistant Professor
Transgenic crops, Insect pest resistance, Abiotic stress tolerance.
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Dr Siddhartha Sankar Ghosh

Assistant Professor
Development of new generation of gene therapy vectors (Viral and Non-Viral) and tests their therapeutic potential on cell culture based systems, Development of reversible immortalized cell lines for drug and therapeutic gene testing, Targeted delivery of siRNA encapsulated with Nanoparticles into liver cells.
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Dr Aiyagari Ramesh

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Molecular fingerprinting of industrial food-grade microorganisms, Food grade cloning and expression system, Identification of bioactive compounds from soil metagenomic library

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Dr (Ms.) Gurvinder Kaur Saini

Assistant Professor

Fungal biotechnology, Biological control of insect pests using entomopathogenic fungi, DNA fingerprinting of entomopathogenic fungi for virulence and other characteristics of economical importance, Development of biopesticide as an alternative to chemical pesticides to sustain agriculture.

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Plant cell, tissue and organ culture, Protoplast isolation and culture, Synthetic seeds production, Biochemical, Cytological and Histological analysis of In Vitro raised plants.

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Computational molecular biophysics, Structural biology, Protein function, In silico drug design.

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Dr (Mrs.) Latha Rangan

Assistant Professor

Functional genomics, Molecular markers, Genetic transformation, Plant tissue culture.

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Faculty joined under the reporting year**Dr. Deba Prasad Nayak**

Assistant Professor

Novel bioreactor design, fabrication and biological reaction engineering, Biological Process Integration, Biological Process intensification, Chromatographic separation of organic and biological compounds, Membrane based separations, Rational design of downstream Processing

Email: nayak@iitg.ernet.in

Dr. Biplab Bose

Assistant Professor

Therapeutic recombinant antibodies

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Dr. Vikash Kumar Dubey

Assistant Professor

Protein Engineering and Structure-Function Relationship of Protein

Email: vdubey@iitg.ernet.in

Faculty promoted to next higher grade under the reporting period.

Dr. Utpal Bora

Assistant Professor

Biomolecule immobilization, Biosensors, Biomaterials and bioassays.

Email: ubora@iitg.ernet.in

Faculty leaving under the reporting period.

None

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