

**"RESEARCH EXCELLENCE TO SUPPORT THAILAND'S  
SOCIO-ECONOMIC DEVELOPMENT"**  
SEPTEMBER 2008 – SEPTEMBER 2009

*Celebrating 25 years*



It is an honour to join the celebration of the 25th anniversary of the National Center for Genetic Engineering and Biotechnology (BIOTEC).

As a member of the National Science and Technology Development Agency (NSTDA), BIOTEC is responsible for supporting and strengthening biotechnology research and development in Thailand. This includes biotechnology knowledge management, human capital enhancement, and scientific infrastructure development. This has contributed to sustainable socio-economic development and environment preservation in Thailand.



Thailand is now entering the era of the "knowledge-based" economy. Under these conditions, biotechnology will be a key factor in economic development and related technology transfers which can enhance Thailand's competitive edge in the global economy. BIOTEC is working closely with the Technology Management Center (TMC) on

a joint 'Lab to Market' project which serves as a go-between for researchers and the private sector to transfer innovative technologies to entrepreneurs. At the same time, it enhances both parties' capacities in terms of commercialisation of technologies and accentuating their abilities to respond innovatively to global market changes. This has also helped generate new businesses and products and thereby job opportunities and income for communities and the nation.

On behalf of NSTDA, I would like to convey my gratitude to all individuals involved in the biotechnology field as well as all staff of BIOTEC for their dedication and hard work. My very best wishes to the center for its continued success.

A handwritten signature in black ink, reading "S. Bhumiratana".

Sakarindr Bhumiratana, Ph.D.  
President  
National Science and Technology  
Development Agency (NSTDA)

BIOTEC will continue to promote research, development and the application of biotechnology to support technology development, transfer and adoption in both public and private institutions in areas critical to national economic and social development. To achieve this, the center will emphasise partnerships with both the private and the public sectors.

Looking ahead, BIOTEC aims to build a "Cell Factory" platform technology which includes the study of many types of cells and how to manipulate them to efficiently produce valuable products such as enzymes, compounds and biologics, among others. The center is looking to build up the capability of the whole process from laboratory and pre-pilot scale to a pilot plant, which is the point when the technology will be ready for industry.



In addition, BIOTEC is looking to further develop its capabilities in the area of genome technology. The focus of the new Genome Institute (GI) at BIOTEC is to work on research and development of technologies related to genomics, proteomics, and bioinformatics. The institute is also providing scientific assistance in high performance computing as an infrastructure for scientific communities.

A handwritten signature in black ink, reading "Kanyawim Kirtikara".

Kanyawim Kirtikara, Ph. D.  
Executive Director  
National Center for  
Genetic Engineering and Biotechnology (BIOTEC)

# A tribute to hrh princess maha chakri sirindhorn for her dedication to biotechnology

Her Royal Highness Princess Maha Chakri Sirindhorn is widely recognised for her lifelong passion for learning and her versatile ability to put knowledge into practice. HRH



continuously offers invaluable guidance and support to the Thai people in many fields and science and biotechnology is no exception. This is reflected in her personal visit to "BIOTEC Yothi-Research Unit" (BIOTEC's first laboratory) in 1998 and graciously presiding over the grand opening of BIO Thailand and BIO Asia Conferences. HRH also advised how to use biotechnological knowledge to further develop the country. In particular, HRH reminded everyone about choosing appropriate technology for the right purpose, while being aware of potential adverse effects of new technology.

To meet HRH's initiatives for applying biotechnology to develop the country, BIOTEC has provided educational development projects for children in remote rural areas. The center has also worked closely with local communities through the application of science and technology in order to improve the standards of living and household earnings of villagers.

HRH has studied biodiversity in different parts of Thailand and is also interested in bioactive compounds and their applications. To this end, BIOTEC has worked hand-in-



hand with its university network to conduct research and development in order to study bioactive compounds in Thai plants at its well-equipped laboratory at Thailand Science Park.

As Thais live on a staple diet of rice, HRH has also paid close attention to germplasm and rice genomes. BIOTEC's Rice Biotechnology Programme is developed to create new varieties of Thai fragrant rice which exhibit significantly improved performance, including tolerance to submergence, salt and drought, while maintaining desirable cooking taste and aromatic qualities.

Under HRH Princess Maha Chakri Sirindhorn's initiatives, BIOTEC has also teamed up with the Chulachomklao Royal Military Academy to develop projects such as: "Application of geoinformatics in environmental management"; "Technology transfer to study of supplement for cultivation developing in Hed Nok Yoong", and; "Design and development of food waste fermentor and the use of fermented product as liquid biofertilizer". As a result, students have been able to apply this knowledge to help people in local communities.



BIOTEC also established "area-based sites" to implement its projects, under the Royal Initiative of HRH Princess Maha Chakri Sirindhorn. The center has transferred technology to the Phu Fah Royal Development Project, one of its area-based sites, to help villagers gain supplementary income. To make use of land after rice harvesting, they were introduced to wheat cultivation. The technology transfer also involved introducing suitable seed varieties, training in seed screening and farm management, as well as the food processing of products such as noodles and bakery goods. Public forums between community residents and experts are also among the activities conducted.

Under HRH Princess Maha Chakri Sirindhorn's initiatives, BIOTEC assists in educational development for children and youths in remote areas of Thailand through the Science in Rural Schools (SiRS) project. The project has been specially developed to promote public awareness of science and technology in order to encourage scientific thinking among schoolchildren. The programme also aims to ensure that young people develop an interest in science and can see the relevance of science in their daily lives.





# Highlights of biotec's research

## USING PLANTS TO REHABILITATE SALINE SOIL

BIOTEC uses plants to rehabilitate saline soil in several parts of Thailand. Techniques to screen for plants that can thrive in high salinity areas were developed. Highly salt-tolerant plants identified from the screening process were tested and it was found that the soil salinity level significantly decreased during the course of a four-year test. BIOTEC later collaborated with a company to plant salt-tolerant plants to reclaim former salt-mining lands.

## DIAGNOSTIC TEST KITS FOR SHRIMP VIRAL DISEASES

Viral infections cause extensive losses to the shrimp farming industry due to their rapid spread and acute infection. Early detection of the diseases can decrease the problem as farmers can contain the infection and harvest the shrimp before entire production ponds are affected. With funding from BIOTEC, a team of researchers successfully developed a nested RT-PCR based detection system for the yellow-headed virus (YHV), gill-associated virus (GAV) and white spot syndrome virus (WSSV). These technologies were licensed to the Shrimp Biotechnology Business Unit for commercial production and marketing of diagnostic test kits.

## PRODUCTION OF STARTER CULTURE FORMULA FOR NHAM (THAI FERMENTED PORK SAUSAGE)

The fermentation technology used by the Nham industry is home based and traditional, relying on adventitious micro organisms. In order to help the producers have greater control over the production process and hence produce products of better quality and safety, pure starter culture technology was introduced. A powdered form of starter culture was developed through funding from BIOTEC and this technology has already been transferred to a private company.

## WASTEWATER TREATMENT

BIOTEC is working with a university to develop a high-rate anaerobic fixed film wastewater treatment system. In addition to treating wastewater, the system also produces methane as a by-product which can, in turn, be used as fuel to generate electricity or for heating, resulting in energy savings and reduced production costs. This technology targets cassava starch factories and has been widely accepted.

## BIOSENSOR FOR AVIAN INFLUENZA H5

BIOTEC collaborates with a company to develop commercial biosensor-based diagnostic kits for detection of H5. The kits are commercial-grade diagnostic tests which employ nano-magnetised particles coupled with highly specific monoclonal antibodies that recognise H5 proteins of H5N1 Thai isolates, allowing highly sensitive measurements of magnetic fields. This technology is helping prepare Thailand in the event of an outbreak. In addition, the knowledge gained from the collaboration is also being adapted for use in other research areas.



## DEVELOPMENT OF CD4+ LYMPHOCYTES TEST KIT

BIOTEC and a team of researcher from a university developed the CD4+ lymphocytes Test Kit to assess HIV/AIDS patients. The team developed the immunochromatographic strip test for rapid screening of thalassemia 1 carriers. The developed method is simple and requires no sophisticated equipment, making it suitable for screening and ruling out thalassemia 1 carriers in mass populations. The test kit has been transferred to a private company for commercialisation.

## DEVELOPMENT OF LOW-COST CELL-PERMEABILISING REAGENT, ENZHANCE

The Enzyme Technology Laboratory of BIOTEC has developed an effective low cost cell-permeabilising reagent, ENZhance, for local industrial use. ENZhance works to improve the efficiency and sensitivity of the enzyme assay. The optimised protocol allows efficient detection of a wide range of target enzymes, which can easily be developed into high-throughput screening. The most important aspects of ENZhance are that it is effective and economical available compared to conventional methods.



# research partnership

Biotechnology has been recognised as an enabling tool and has applications in various sectors of the economy. It is therefore imperative for BIOTEC to work in partnership with other government and non-government bodies.

BIOTEC has worked with the Ministry of Agriculture and Cooperatives, the Department of Agriculture, the Department of Agricultural Extension, and the Rice Research Institute to develop new varieties

of rice which can sustain and recover from floods; with the Department of Fisheries to conduct research on shrimp, with the Department of livestock to conduct research on avian influenza H5 and dairy cattle.

# international collaboration



As science is borderless, BIOTEC encourages collaboration with international partners and is actively engaged in a number of international activities.

To foster scientific collaboration between Thai and foreign researchers, BIOTEC joined the Thai universities – Institute of Research for Development (IRD), and the French Agricultural Research Centre for International Development (CIRAD) – to conduct joint research on "Molecular and Genomic Analysis of Oil Palm Fruit Development" during 2007-2008.

Other BIOTEC projects include acceptance in December 2005 to become a member of the Generation Challenge Programme (GCP), a non-profit programme under the Consultative Group on International Agricultural Research (CGIAR), which aims to utilise advances in molecular biology to harness the rich global heritage of plant genetic resources and create new generations of crops.

With its multitude of international activities, BIOTEC is recognised as a regional R&D and training hub in biotechnology. The center has been entrusted by international organisations to provide training workshops for the region. The BIOTEC Human Resource Development Program for Neighbouring Countries has been in operation since 2001, offering short-term training courses and fellowships to young researchers from neighbouring countries to work/train in BIOTEC laboratories. BIOTEC, through its research units, has extensive experience in organising customised short-courses for international aid agencies and private companies.



# awards, publications and patents



2008 ASEAN Science and Technology Meritorious Service Award



HHMI International Research Scholar



The First Japan International Award for Young Agricultural Researchers, Ministry of Agriculture, Forestry and Fisheries (MAFF) of Japan



2007 UNESCO-L'OREAL International Fellowships



US patent for the discovery of Anti-malarial Pyrimidine Derivatives and methods of making and using them

From 2004-2008, BIOTEC received 82 national patents, 15 international patents, 1,081 international publications and 25 international awards.

Highlights of awards and honours conferred on BIOTEC researchers for their achievements include the following.

## 2008 ASEAN SCIENCE AND TECHNOLOGY MERITORIOUS SERVICE AWARD

Prof. Morakot Tanticharoen, BIOTEC Senior Advisor, was awarded the prize in recognition of her significant contribution towards the promotion and development of regional cooperation in the scientific and technological fields, and the upgrading of the regional, scientific and technological capabilities of Thailand.

## HHMI INTERNATIONAL RESEARCH SCHOLAR (HHMI)

Dr. Sumalee Kamchonwongpaisan was the first Thai to receive the prestigious HHMI International Research Scholar in Infectious Diseases and Parasitology. Her research focuses on an anti-malarial drugs. Dr. Sumalee Kamchonwongpaisan is currently working at the Protein-Ligand Engineering and Molecular Biology Laboratory.

## THE FIRST JAPAN INTERNATIONAL AWARD FOR YOUNG AGRICULTURAL RESEARCHERS, MINISTRY OF AGRICULTURE, FORESTRY AND FISHERIES (MAFF) OF JAPAN

Dr. Chalermopol Kirdmanee received this award for his achievements in the development and extension of *in vitro* selection and mass propagation for the production of high quality transplants of medicinal, food and industrial crops.

## 2007 UNESCO-L'OREAL INTERNATIONAL FELLOWSHIPS

Dr. Chawanee Thongpanchang, a researcher at Bioresources Unit, was awarded the UNESCO-L'OREAL International Fellowship for the "Scale-up Process for the Anti malarial Leads Synthesis". She also received a two-year training grant to acquire advanced skills and apply them to newly identified enzyme inhibitors at the University of Zurich, Switzerland. Her research work will contribute to strengthening the pharmaceutical industry in Thailand and to the development of innovative medicines for neglected diseases.

## US PATENT FOR THE DISCOVERY OF ANTI-MALARIAL PYRIMIDINE DERIVATIVES AND METHODS OF MAKING AND USING THEM

BIOTEC research team of Prof. Yongyuth Yuthavong, Dr. Bongkoch Tarnchompoo and Dr. Sumalee Kamchonwongpaisan obtained the US patent in June 2007.

## 2006 TECHNOLOGIST AWARD

A team of researchers from the BIOTEC Food Laboratory received the 2006 Technologist Award for their research work on starter culture for the fermented food industry. The use of starter cultures will allow the manufacturers to control the fermentation process resulting in products of higher quality.



2006 Technologist Award









# ABIC 2009

22 - 25 September 2009

Queen Sirikit National Convention Center,  
Bangkok, Thailand



### Organized by:

National Center for Genetic Engineering and Biotechnology (BIOTEC)  
National Science and Technology Development Agency (NSTDA)  
Ministry of Science and Technology (MOST)

### Activities at ABIC 2009 include:

#### 1. ABIC 2009 International Conference:

Conference program will consist of lectures presented by more than 50 speakers, as well as oral/concurrent and poster sessions. Program topics include:

##### • Plant and Animal Biotechnology

###### Confirmed speakers

1. Dr. William James Peacock, CSIRO-Plant Industry, Australia
2. Prof. Charles J. Arntzen, Regents' Professor and Florence Ely Nelson Presidential Chair, The Biodesign Institute at Arizona State University
3. Prof. German Spangenberg, Plant Biotechnology Centre, Primary Industries Research Victoria, Australia
4. Dr. T.J. Higgins, CSIRO Plant Industry, Australia
5. Dr. Timothy J. Tramburg, IFD, France
6. Dr. David Fischhoff, Monsanto, USA
7. Dr. Jacques Bouvier, Novartis Animal Health Ltd., Switzerland

#### + Aquaculture Biotechnology

##### Confirmed speakers

1. Dr. John A.H. Benzie, Marine Biotechnology, Moana Technologies, USA
2. Prof. Timothy William Flagel, Centex Shrimp, Mahidol University, Thailand
3. Prof. Patrick Sorgeloos, Faculty of BioScience Engineering, Ghent University, Belgium

#### 2. BioAsia 2009 Trade Exhibition Show: The 3<sup>rd</sup> International Trade Exhibition on Biotechnology

#### 3. Business Partnering Program

##### Abstract Submission

Prospective authors of oral and poster presentations for ABIC2009 are invited to submit abstracts in English for consideration by 1 April 2009. Abstract can be submitted online to ABIC 2009 Secretariat. The result of acceptance will be announced no later than 15 May 2009.

##### Poster Awards: USD 1,000

These best posters will be judged by a Poster Award Committee and announced on 25 September 2009. Each winner gets USD 1,000.

##### Registration

Please enter to the conference official website: <http://www.abic.or.th/ab2009>. Please note that the "Early Bird Rate" will be ended on 15 June 2009.

##### Contact

Secretariat of ABIC 2009  
National Center for Genetic Engineering and Biotechnology (BIOTEC)  
Tel: (66) 2564 6700 ext. 3379 - 3381 Fax: (66) 2564 6714  
E-mail: [ab2009@biotec.or.th](mailto:ab2009@biotec.or.th)

Information about the preliminary program, abstract submission, registration or general information will be updated regularly on the conference official website: <http://www.abic.or.th/ab2009>



## Fungal Evolution and Charles Darwin : From Morphology to Molecules

6-17 July 2009

Queen Sirikit National Convention Center, Pathumthani, Thailand

Organized by: National Center for Genetic Engineering and Biotechnology (BIOTEC)  
National Science and Technology Development Agency (NSTDA)  
Ministry of Science and Technology (MOST)

### Key Topics to be Discussed

1. Speciation and species concepts
2. Bio - and phylogeography
3. Tree of life
4. Morphology, evolution and their evolution
5. Medical mycology
6. Co-evolution of fungi and associated Natural history

### Confirmed Speakers

- |                              |   |
|------------------------------|---|
| 1. Prof. Nayind Blackwell    | Department of Biological Sciences, Louisiana State University, USA            |
| 2. Prof. Jacques Beaudouin   | Department of Population Biology, University of Exeter, Devon, UK             |
| 3. Prof. Marko C. Fisher     | White Molek and Henry Clay, Imperial College London, UK                       |
| 4. Prof. Jes Christian Friis | Department of Systems Biology, Technical University of Denmark, Denmark       |
| 5. Dr. Linda Keller          | Department of Biology and Evolutionary Biology, University of Toronto, Canada |
| 6. Prof. Gregory M. Mueller  | Chicago Botanic Garden, USA   |

### Abstract Submission

Prospective authors of poster presentations are invited to submit abstracts in English for consideration. Abstract can be submitted online to the conference secretariat.

### Topics of Abstracts

1. Speciation and species concepts
2. Bio- and phylogeography / phylogenetics / applied genetics
3. Behavioral and food ecology
4. Natural products
5. Medical mycology
6. Classification of fungi and associated
  - Associations with plants
  - Associations with animals and humans
  - Pathogenic and antibiotic production
7. Biotechnology, population genetics and ecology

### Registration

Please call for information of abstract to be submitted on 15 March 2009.  
Final deadline to submit abstract is 31 March 2009.

The online registration will be opened on 1 January 2009.

### Registration Fees

	Abstracts (USD 200)	Abstracts and Poster Sessions (USD 250)	Abstracts and Poster Sessions (USD 300)	Abstracts and Poster Sessions (USD 350)
Foreign Delegates	1000 USD	1200 USD	1400 USD	1600 USD
The Organiser	None	None	None	None
The Student	200 USD	300 USD	400 USD	500 USD

### Conference Secretariat

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