

Synthesis

where great innovations come to life

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DNA Vaccine

CT Wave Probe

Detection of GMOs

Shaping
the
First Class
professionals!

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Photographs courtesy Ahmad Fua'ad Alwi & Nayan Kanwal

The Revolution of Synthesis!

The Managing Editor is delighted to announce the new look of the Synthesis, the only official Research News of Universiti Putra Malaysia. Ever since its notable introduction in 2003, Synthesis has gone through several phases of makeover; sizes, thickness, layouts as well as its contents.

Starting this year, the team has decided to give Synthesis a more stylish yet classic touch to its overall look starting from the front cover to the last page! More colourful pages and photos are also incorporated to add more zing to its overall appearance. Above all, there is a new attention-grabbing tagline "*where great innovations come to life*" to suit its new theme.

The managing editor would like to thank everyone for their great suggestions, contributions and continuous support for Synthesis. We are also pleased to announce that its circulation has surpassed more than 4,500 copies nationwide and beyond to Southeast Asia. We really hope to keep up the good work and look forward to seeing another climb in the readership of Synthesis. The readers are always welcome to flood our mail box with ideas, critics and comments for the betterment of this publication.

Synthesis is published quarterly by Research Management Centre (RMC) and it is available for free to the academic community.

Are you reading your own copy of the UPM R&D Digest?

Synthesis is the first and only quarterly R&D digest at Universiti Putra Malaysia published in March, June, September and December with the focus on award-winning innovations. It covers research happenings emerging from the various faculties and institutes across the university and provides a brief summary of some of the important research findings of the study conducted at UPM. It brilliantly features special topics that are of national interest in various fields and disciplines.

Scientists must be made aware of how important the impact of their work is and its possible applications on society and public opinion. It is hoped that this digest will provide the opportunity to interact particularly through feedback or direct mail to the scientist from either the private sector or by scientists from other government research institutions.

Synthesis is the official research bulletin of the University and is published by Research Management Centre. It is available free of charge to the academic community.

Readership

Researchers, academicians, postdoctoral researchers, technicians, postgraduate studentships, research institutions, techno-entrepreneurs, venture capitalists and laypeople.

If you would like to receive a copy of the Synthesis for research updates every 4 months, or would like further information about Research Management Centre, please contact at the address given on this page or send an e-mail message to ndeeps@admin.upm.edu.my with the only content in the body of the email message being "subscribe synthesis" to be added to the mailing list.



Editorial

UPM Honours its Researchers

Anugerah Penyelidik Cemerlang (APC) 2007

Giving recognition is one of the pre-eminent ways to persuade as well as to ensure rewarding input and output in a research intensive university. It also encourages the people especially the researchers working together through this small "carrot". And one of the best ways of doing this is by having a competition among the academia.

Researcher Excellence Award (APC) is just around the corner! For three consecutive years, the Office of Deputy Vice Chancellor (Research & Innovation) continues to honour UPM's researchers through this annual event.

This year's APC, which will be held in the first quarter of this year, will recognise researchers for their dedication, determination and commitment towards R&D development throughout the year 2007.

Generally, there are five awards presented at the APC. The **International Excellence Award** was established to honour the individual who received special award or research fellowship accredited by international governing bodies. **Commercialisation Award** commemorates researchers who have successfully commercialised and penetrated their research products into the demanding market.

Realising the importance of publications in high impact and cited journals, an award for **Excellent Publication** was introduced. The scholarly impact will reflect UPM's credibility which consequently gains significant international reputation. The university also recognises young researchers, aged below 35, for their excellent research record by initiating **Young Researcher Award**.

The winners for these four categories are judged and assessed by an independent Review Committee based on the reviews of the nominee's reports.

Last but not least is the **International Special Award** which is honoured to researchers who have gained outstanding recognition at the overseas international innovation and invention shows. The success of UPM researchers at the international level is much due to the high quality research delivered that deserved them world appreciation. For a record, UPM has secured 2 medals at INPEX (USA), 2 medals at BIS (UK), 4 medals at IENA (Germany) and 9 medals and a special award at EUREKA. (Belgium).

The university is indebted to its pool of excellent researchers for their continuous effort and perseverance in high quality research performance which led to the designation by the government as one of the research universities of the nation. Now, research has become an adapt culture in UPM. Thus, the best method to keep the momentum is by honouring our researchers. So, be inspired.....! 

Irmawati Ramli



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Spotlight

What is a Citation Index

How many times a document is cited by other writers is an indication of its importance and whether or not a particular work has credibility.

A citation index is a bibliographic index which allows the user to trace research from an article by searching for subsequent articles that have cited that original. It can also be defined as an article database that indicates how many times the work of one author has been referred to, or cited, by another author, and where.

A high number of citations generally indicate a high level of quality. Cited reference searching enables you to find articles from journals that have cited a book, a patent or another article. Through a cited reference search, you can discover how a known idea or innovation has been confirmed, applied, improved, extended or corrected. Article citations also may be the best way to assess the merits of a particular author or article.

A journal cited in a reference of an item (source item) published in an SCI source journal (citing journal) for example is referred to as cited journal. A cited journal is not necessarily covered by the SCI; that is, it may not be found in the listing of citing journals. Most cited journals, however, are also citing journals. Cited Journal is used as a column heading in the Cited Journal Package of the JCR. Items in that column may include so-called 'soft' journals and other serial publications. Such entries have been retained for their information value.

A measure of how quickly the 'average cited article' in a particular journal is cited is known as immediacy index. A journal's immediacy index considers citations made during the year in which the cited items were published. Thus, the 2007 immediacy index of Journal X would be calculated by dividing the number of all journals' 2007 citations of items it published in 2007 by the total number of source items it published in 2007. It should be obvious that an article published early in the year has a better chance of being cited than one published later in the year. As a result, journals published weekly and monthly will theoretically have an advantage, as regards immediacy, over journals published quarterly and semi-annually.

A measure of the frequency with which the 'average cited article' in a journal has been cited in a particular year is known as the impact factor. Impact factor is based on the number of times that articles in a journal are cited in the two years following the year of publication. The impact factor of a journal is calculated by dividing the number of current year citations to the source items published in that journal during the previous two years. Thus, the 2007 impact factor of journal X would be calculated by dividing the number of all the SCI source journals' 2007 citations of articles journal X published in 2005 and 2006 by the total number of source items it published in 2005 and 2006. High impact factor or highly cited journals are considered more prestigious and important. There are other ways of calculating journal impact as well.

The impact factor is useful in evaluating the significance of absolute citation frequencies. It tends to discount the advantage of large journals over small ones, of frequently issued journals over less frequently issued ones (weeklies vs. quarterlies or annuals); of older journals over newer journals. In each such case the first is likely to produce or have produced a larger citable corpus than the second. All things being equal, the larger that corpus, the more often a journal will be cited. The impact factor allows some qualification of quantitative data. The qualification is algorithmic and objective, but nonetheless useful in journal evaluation. 

Managing Editor



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Shaping the First Class Professionals!

Much of the literature concerned with knowledge utilisation suggests that a range of people and organisations provide a linking and integrating function between the worlds of research and practice. The linkage shows - considerable importance in summarising and interpreting the findings of educational research in ways that make them more accessible to practitioners. The result of their roles provides important perspectives on the impact of research.

One particular group in relation to the impact of educational research is postgraduate students in universities. Realising how significant their roles are, UPM School of Graduate Studies (SGS) continues to be an excellent education hub, providing conducive environment and friendly customer services in producing quality graduate students. SGS has also developed a web-based Internet Graduate Information Management System (IGIMs), which is a complete on-line process from the application procedures until the students' convocation. Among others, it contains important students' information and academic progress report. This system can be accessed by the students, supervisors and relevant authorities. It provides an easy venue for monitoring the students' academic progress, by the supervisors and the faculties.

There is an on-going review of the curriculum and the research areas which is concurrent with the current global development. The effort made by SGS is also in-line with the much talk APEX University's objectives of producing the "Human Capital with First Class Mentality". Ever since 1977 until 2007, SGS has proudly honoured approximately 11 800 Masters graduates and 1100 PhD graduates in a variety field of studies. In fact until today, UPM is still the highest "producer" of Doctor of Philosophy (PhD) graduates, per year, as compared to other universities in Malaysia.

UPM has also become the popular choice local university among the students to pursue their postgraduate studies. Over the past few years UPM has witnessed booming number of student enrolments and applications every semester. UPM's aggressive efforts in promoting its education and research achievements as well, have managed to exert a pull on students from different parts of the world.



UPM started its graduate programmes in 1975 as part of its overall effort to provide an environment in which research and free inquiry of ideas would thrive, and to make available to society the results of such activities. Currently SGS has more than 2100 (33%) international postgraduate students from 67 countries.

The historic milestone has privileged UPM to become a trendsetter in many aspects. UPM is the first National Higher Education Institution (IPTA) to enforce the minimum English language proficiency as part of the entry requirements recently. The prospective students need to achieve a minimum score of 6 in International English Language Testing System (IELTS) or 550 in Test of English as a Foreign Language (TOEFL) to eligible them to apply for admission into postgraduate studies in UPM.

In-line with the designation of UPM as Research University (RU), most of the programmes offered are research based. Not leaving the facet of the importance of having broad knowledge, UPM also offers postgraduate programmes by coursework which have "hands-on" approach to meet the needs of relevant industries and to keep up with the global expectations. The students are also encouraged to attend short up-skill courses and workshops organised by SGS and faculties, such as, academic/thesis writing, research publications, supervisors' expectations and other interpersonal skills courses.

The efforts are also parallel with SGS mission and vision of producing quality graduates instead of quantity. But what matter the most for us at SGS is we want a quantity of quality postgraduates! **RMC**

Expert's snapshots

Professor Dr. Aini Ideris is currently the Dean, School of Graduate Studies. She is also the Chairperson of Malaysia Deans of Graduate Studies Council for IPTAs since 2005 and the National Coordinator for Animal Biotechnology. She has been with UPM for more than 29 years and as the Dean of the Graduate School since 1 May 2001. Her area of expertise is Avian Medicine. Her breakthrough in research is the new heat resistant Newcastle disease virus, V4-UPM. Prof Aini has over 400 publications to her credit and is well known internationally among other avian veterinarians. She has supervised the final year projects of more than 30 Doctor of Veterinary Medicine (DVM) students, graduated more than 20 Master and more than 15 PhD students. Throughout her career, she has won numerous international and national awards for her innovative research contribution in developing vaccines for viral diseases of poultry. Her research team has successfully commercialised 3 poultry vaccines. Prof Aini was the recipient of 2007 Vice Chancellor's Fellowship award (Excellence in Research). In conjunction with OIC meeting in 2003, Prof Aini was selected as one of the 11 successful professional ladies in Malaysia, introduced by the Malaysian First Lady, the Prime Minister's wife. Prof. Aini can be reached at + (603) 8946 4201/ 4202 or via email at aiini@admin.upm.edu.my.

Periphyton-Bacterial Complex:

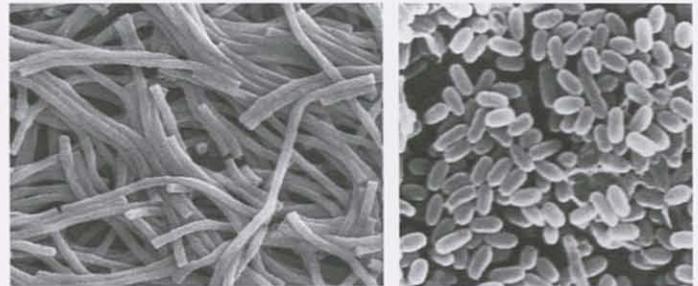
A Novel System for Improving Water Quality and Shrimp Postlarvae Survival without Water Exchange



PeriBact kit

Low survival and weak postlarvae remain as the main bottlenecks of shrimp larviculture industry in Malaysia. High concentrations of toxic nitrogenous compounds such as ammonia and nitrite are some of the key limiting factors in the larval rearing system. Frequent water exchange to overcome the poor water quality problems in postlarvae culture tanks may increase the risk of disease problems, and the discharge of large amount of waste water from hatchery in which may cause environmental pollution in rivers and coastal areas. In addition, inadequate high quality live-feed for the critical stages of larval development, and lack of shelters to prevent cannibalism also contribute to the low survival and poor postlarvae health in shrimp hatcheries.

To establish a suitable environment for production of healthier larvae, attached microalgae (periphyton) and bacteria were used in combination to form a periphyton-bacterial complex (PeriBact). This novel system maintains high water quality in culture tanks by absorbing toxic waste compounds such as ammonia and nitrite, provides high quality live feed, reduces cannibalism, and decreases pathogenic vibrios. Periphytic



Indigenous microorganisms for PeriBact

microalgae significantly reduces toxic ammonia and nitrite up to 90%. In addition, the highly nutritious periphytic diatoms (high protein contents of 30-40%; lipid 25 to 35% and eicosapentaenoic acid (EPA) of 5 – 15%) provide high quality feed for the shrimp larvae. Similarly, bacteria do not only contain high protein (> 60%) and essential amino acids, but also are efficient in reducing ammonia concentration. The combination of high quality periphyton and beneficial bacteria that forms a complex further enhances the water quality, increases the survival and renders the larvae healthier and more tolerant to environmental stressors. Our studies illustrated that survival of shrimp postlarvae cultured in PeriBact complex was significantly higher (83%) compared to those grown without the complex (37%). Experiments using reverse salinity stress test, i.e. when the larvae were transferred from 29 ppt salinity to freshwater and maintained for 2 hours, clearly showed that postlarvae cultured in PeriBact complex were significantly healthier and more tolerant to stress. The PeriBact complex is very efficient in maintaining water quality in the larvae culture tanks and there is no necessity to change the water throughout the 2-week culture period.

The PeriBact complex revolutionises the shrimp larval culture practice, not only by increasing the survival of the larvae, but also produces healthier shrimps and simplifies the larval culture technique. This technology is patent pending. 



- GOLD Malaysia Technology Expo (MTE 2007)
- GOLD UPM Invention, Research & Innovation Exhibition (PRPI 2006).

Fatimah Md. Yusoff, Mohamed Shariff, Helena Khatoun and Sanjoy Banerjee

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DNA Vaccine for Enterovirus 71

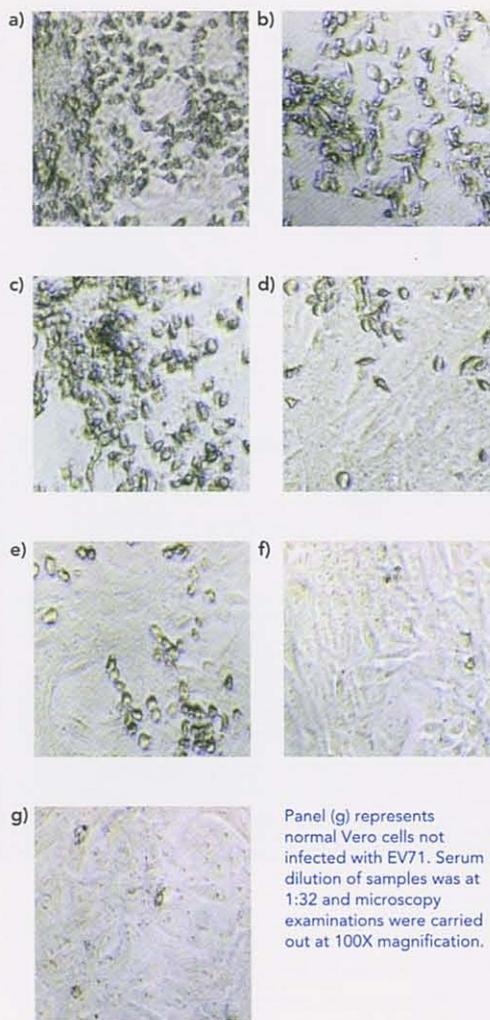
Enterovirus 71 (EV71), along with coxsackievirus A16 (CA16), is a major causative viral agent responsible for large outbreaks of hand, foot and mouth disease (HFMD), a common rash illness among children and infants. EV71 is thought to spread by contact with fecal contaminated materials. Infection by the virus is often asymptomatic or may manifest as mild self-limiting illness which is often characterised by the presence of characteristic lesions on the palms, soles and oral mucosa.

An unusual epidemic of HFMD complicated by fatal myocarditis and pulmonary edema occurred in Malaysia in 1997, and EV71 had been implicated as the etiology of the outbreak.¹ Thirty-one children in Sarawak, and four children in Peninsular Malaysia succumbed to the infection within hours of admission to the hospitals.² The largest EV71 epidemic reported to date occurred in 1998 in Taiwan in which a variety of clinical manifestations and involved more than 90,000 children infected with HFMD.³

Since there is no effective antiviral treatment for severe EV71 infections and no vaccine is available, the only current means to prevent EV71 infection is through avoidance of contact between infected and susceptible individuals.⁴ Hence, the need for an effective EV71 vaccine is urgent to immunise the population at risk should an outbreak occur.

DNA vaccination differs from traditional vaccines in that only the DNA coding for a specific component of a disease-causing organism is injected into the body. In this study, a DNA vaccine encoding the VP1 gene from local outbreak isolates of EV71 was designed and constructed in an appropriate plasmid vector. The DNA can then be administered either in a saline solution injected through a hypodermic needle or on DNA-coated gold beads propelled into the body using gene guns. The actual production of the immunising protein takes place in the vaccinated host. This eliminates any risk of infection associated with some live and attenuated virus vaccines.

However, prior to testing in humans, vaccine candidates require testing in animal models. This vaccine candidate was tested *in vitro* for expression of VP1 protein in a mammalian cell line and shown to be expressed in a cell-free *in vitro* expression system using RT-PCR, Indirect Immunofluorescence Assay and western blotting. Subsequent *in vivo* testing for the ability for the



Panels (a) and (b) show almost 100% CPE in Vero cells as a result of mice sera immunised with plasmid vector pVAX1 and PBS (negative controls), respectively.

Panel (c) represents the virus control with almost 100% CPE observed. Panels (d) and (e) show the neutralising activity of mice sera immunised with constructs pVAX1/VP1-5 and pVAX1/VP1-4 respectively, where approximately 50% CPE was observed.

Panel (f) shows almost 100% neutralisation of EV71-infected human positive serum where no CPE was observed.

Panel (g) represents normal Vero cells not infected with EV71. Serum dilution of samples was at 1:32 and microscopy examinations were carried out at 100X magnification.

Virus neutralisation test of immunised mice sera: The neutralising activity of immunised mice sera against EV71 on day 14 was evaluated by virus neutralisation test using Vero cells.

protein to be expressed and to elicit an immune response in mice showed that VP1 IgG levels in mice immunised with the DNA vaccine constructs increased after the first booster but declined following the second booster. In addition, the anti-VP1 IgG in the mice immunized with the DNA vaccine constructs exhibited neutralising activity against EV71.

Since the human receptor molecule(s) for EV71 remains unknown, efforts towards its identification remain a major priority in EV71 vaccine research, as it will allow the development of a transgenic mouse model for studies of EV71 pathogenesis and vaccine efficacy. Meanwhile, the promising results obtained in the present study have prompted further testing to improve the expression and immunogenicity of this potential EV71 DNA vaccine. 

● SILVER Innovation Award, Biotechnology Asia 2006



Rozita Rosli, Wong Siew Tung, Zamberi Sekawi and Sazaly Abu Bakar

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Converging Thermal Wave Probe a.k.a. CTWaveProbe™

A major hurdle facing nanotechnology implementation is in how samples of nano-scale dimensions can be probed. Parts of the problems include sample mounting, making contact with the sample; the possibility of that the act of measuring alters the sample, repeatability and accuracy of measurement and referencing reference metrology to calibrate various tools to perform required measurements.

Most of the problems can be solved by using non-contact and non-destructive testing (NDT) tools. In a nutshell the tool sends information carriers which non-destructively interact with materials beneath the surface and carries the results of the interaction back to the tool to be analyzed for matters of interest that remain hidden from unaided eyes. In the CTWaveProbe™ (Figure 1), the information carriers are converging thermal waves which convey information that can be analyzed (Figure 2) for the sample thermal diffusivity or its associated thermal properties. Higher thermal diffusivity materials are better able to transfer heat than to absorb heat and are therefore less likely to trap heat and cause overheating. Overheating is common problem which comes along with consumer product miniaturisation that results in surge of power density.

There are other tools in the market that can measure the thermal properties but rendered useless when it comes to high conductivity sample of submicron thickness. Thin layers made of materials of high conductivity such as gold, diamond or graphene are commonly used either as heat spreader or other functional materials. Before the birth of the CTWaveProbe™ measurement of thermal properties of those materials has never been so simple. This simple innovation was successful in solving all the problems related to:

- Weak detected signal
- Annulus zero width
- Zero size detection area
- Complicated operating procedure
- Annulus radius measurement
- Expensive manufacturing and maintenance
- Portability and mobility
- Sample surface radiation damage

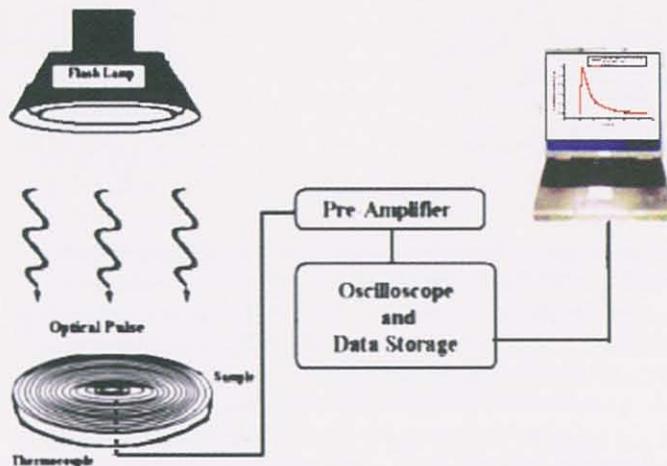


Figure 1: Schematic diagram of the CTWaveProbe™

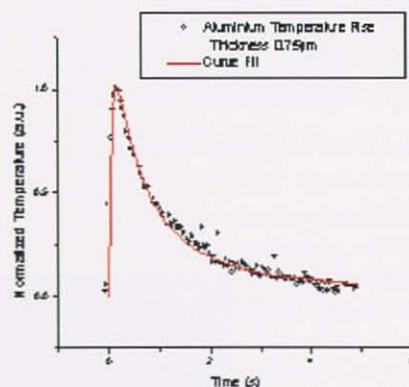


Figure 2: A typical of CTWaveProbe™ thermal wave signal analysed with its theoretical signal (continuous line).

What is more remarkable is those advantages have been achieved by doing away with the expensive and massive laser and its complicated beam delivery optics which form the major components in all commercial tools.

Within the limitations of standard samples available the CTWaveProbe™ has measured high conductivity samples as low as 750 nanometers.

This innovative R&D product is Patent pending (PI 20071569). 



● GOLD
● Special Award
● GOLD

Malaysia Technology Expo (MTE 2007).
Malaysia Technology Expo (MTE 2007).
International Exhibition of Ideas-Inventions-New Products (IENA 2007).

Mohd Maarof Moksin and Mohd Shahril Husin

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The spacecraft missions are becoming more challenging in the recent years. Additionally, the requirements for space missions in terms of their performances are also gradually increasing. Therefore, the spacecraft have received attention for further optimisation.

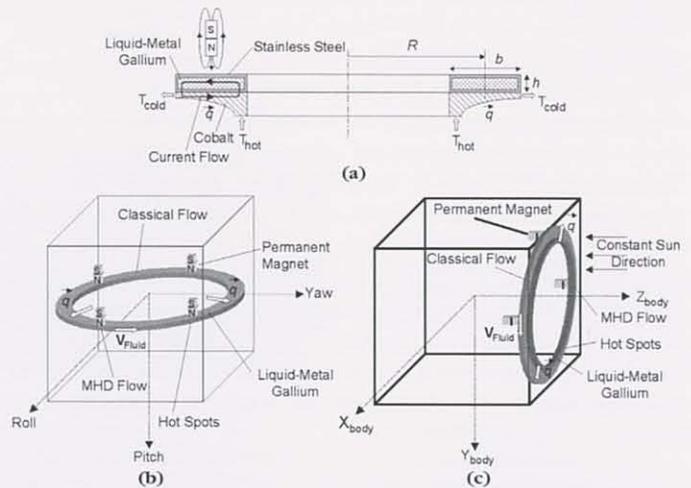
A Novel Hybrid Spacecraft Attitude Control System

An approach would be to enhance the capabilities of each existing sub-system without altering the overall mass and volume budgets as in the same level today. Recent technology advances have triggered an appreciable enthusiasm towards off-the-shelf spacecraft sub-system concepts.

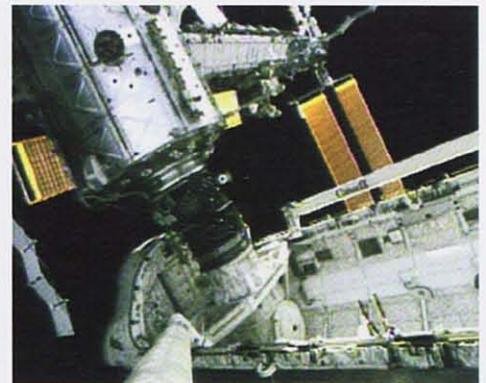
In this research project, two subsystems that are of paramount interest are the attitude control system (ACS) and the thermal control system (TCS). Till to date, there is no attempt made to couple both the conventional systems. Therefore, this work is the maiden work towards integrating the conventional separate attitude and thermal control systems, forming the combined attitude and thermal control system (CATCS).

The feasibility of this concept for future spacecraft is proven and the combined concept is validated. The CATCS consists of an electric conducting fluid that circulates in a closed loop simultaneously serving for the attitude and thermal controls. The CATCS benefits from the onboard excess heat by generating thermoelectricity for its operation. In this regards, the need of the onboard power supply could be partially reduced. Hence, the commissioning of CATCS on the future spacecraft would benefit the missions, e.g., life duration, reliability and performance enhancements, mass and volume savings, etc.

The CATCS concept is judiciously a feasible and a potential off-the-shelf spacecraft subsystem. 



A Novel Hybrid Spacecraft Attitude Control System



● GOLD World Exhibition of Innovation, Research & New Technologies (EUREKA 2006).



Renuganth Varatharajoo

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Surface Plasmon Resonance Biosensor Chip for the Detection of GMOs



The SPR GMO Biosensor Chip



Machine for the SPR GMO Biosensor Chip (BIACORE3000A)

Modern biotechnology methods are being used to genetically modify plants. The use of genetically modified organisms (GMOs) as food and in food products is becoming more and more widespread. Therefore monitoring of the foodstuff is based on the detection of the foreign DNA sequences born by the genetically modified organisms is essential.

Thus analytical methods for the detection of GMOs are necessary in order to verify compliance with labelling requirements. It requires that GMOs be traceable throughout the chain from farm to table and provide consumers with information by labelling all food and feed consisting of, containing or produced from a GMO and this will enable freedom of choice and ensure environmental safety in regulating GM food and feed issues. It has become extremely important to determine the presence of the recombinant counterparts in plants and food products for regulatory, environmental, safety and world trade issues. An essential prerequisite for the application of food labelling directives is the availability of analytical control methods. Therefore, it is important to have a highly sensitive, rapid, simple, reproducible and reliable test that can detect these recombinant counterparts.

In the research undertaken, application of surface plasmon resonance (SPR) biosensor in detection of genetically modified organism (GMO) is demonstrated. A total of four biotinylated probes namely Tnosb, P35Sb, LECb and TSQb targeting terminators, promoters, internal control and herbicide resistant gene fragment respectively were successfully immobilised onto the SA chip.

Results analysis indicated that the SPR system with the sensor chip enable the detection of GM fragments as low as 1 nM. Biospecific interaction analysis (BIA), employing SPR and biosensor technologies provide easy, rapid and automatable approach in detection of GMOs. Short assay times, label free DNA hybridization reaction and no toxic compounds are required, i.e. ethidium bromide, and the reusability of the sensor surface chip are some of the factors that contribute to the general advantages of the SPR biosensor system in detection of GMOs. **RMC**



Young Researcher's Award 2007

- **Bronze** UPM Invention, Research & Innovation Exhibition (PRPI 2007).
- **SILVER** International Invention Innovation Industrial Design & Technology Exhibition (I-TEX 2007).
- **Bronze** International Exposition of Research & Inventions of Institutions of Higher Learning (PECIPTA 2007)
- **SILVER** (2 awards) UPM Invention, Research & Innovation Exhibition (PRPI 2006).
- **Bronze** UPM Invention, Research & Innovation Exhibition (PRPI 2006).
- **Bronze** Innovation Award, Biotechnology Asia 2005

Cheah Yoke Kqueen and Son Radu

Reader Enquiry

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Asia Pacific Natural Products Expo (NATPRO) (27-29 Mar 2008)

1. **CAPTURE THE MOMENT:** (from left) Deputy Ministry of Science, Technology and Innovation, Y.B Tuan Fadilah Yusof signed the guest book at the UPM booth while Dr Irmawati looks on.
2. **THE BACKBONE OF PROMOTION DIVISION:** (from left) Baizura Jamaluddin, A/P Dr. Irmawati Ramli and Nasreena Hailani.
3. **FROM ICC DESK:** The ICC booth was one of the main attractions of UPM at NATPRO 2008!



Putra Academia Night (Malam Gemilang Putra) 2008 (26 Feb 2008)

1. **A WARRANT OF ASSURANCE!** (From left) Prof. Dato' Dr. Wan Md. Zin Yunus, A/P Dr. Sidek Hj. Abdul Aziz and A/P Dr. Mansor Hj. Ahmad.
2. **WHAT IS TAKES TO BE A GOOD TEACHER!** UPM's prominent researcher, A/P Ir. Dr. Mohd. Saleh Jaafar is the recipient of APP '07 Engineering cluster.
3. **INSPIRATIONAL:** UPM Vice Chancellor Prof. Datuk Dr. Nik Mustapha R. Abdullah presenting a token of appreciation to Tan Sri Datuk Dr. Arshad Ayub.



Malaysia Technology Expo (MTE) 2008 (21-23 Feb 2008)

1. **THE HANDS THAT ROCK THE CRADLE RULE THE WORLD!** Prof. Dr. Faridah Abdullah from the faculty of Science, the winner of MTE's "The Very Best Award".
2. **MARK THE RECORD:** Deputy Secretary-general of MOST, T. Bhg. Dato' Alihan A. Hamid (middle) officiating the MTE 2008.
3. **IN THE SPOTLIGHT:** An R&D product by A/P Dr. Abdul Rashid Mohamed Sharif is in the midst of attention!
4. **WE LOVE UPM!** Post graduate foreign students contributing to UPM's victory!



Clay nanocomposites accounted for nearly one-quarter (24%) of total polymer-based nanocomposite consumption by value in 2005, followed by metal and metal oxide nanocomposites (19%) and carbon nanotube composites (15%). By 2011, clay nanocomposites are projected to increase their market share to 44%.

Global consumption of polymer-based nanocomposites was over USD90 million in 2003, USD252 million in 2005, and will reach USD288 million by the end of 2006. An average annual growth rate (AAGR) of 24.4%, USD857 million by 2011.

Fire retardant materials are widely used in building and construction, electrical & electronic, wire & cable, transportation (automotive, airplane, ship, railway), textile & cloth and furniture industries.

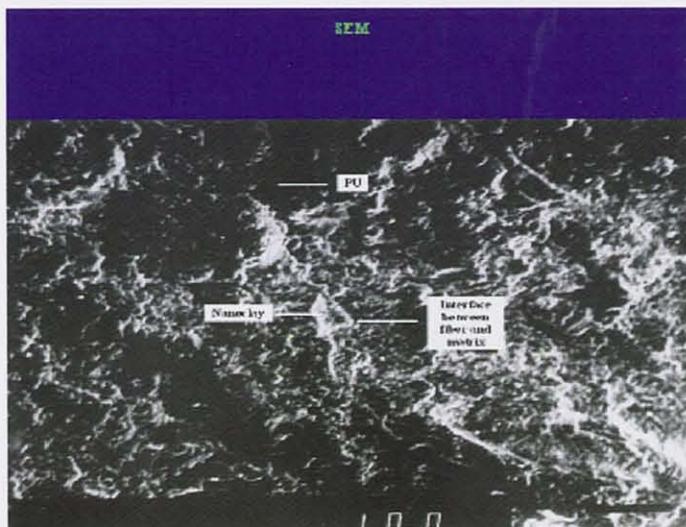
Polyurethane (PU) is used widely as fire retardant materials for buildings and thermal insulating materials for transporting foods and LNG. However, pure PUs show poor in thermal resistance which limit their applications.

Polyol is a raw material for manufacturing PUs which is normally derived from petrochemicals of crude oil or coal in which the processes contribute to global warming and the feedstock (especially petroleum) susceptible to oil crisis.

Production of PUs from polyol based palm oil for making PU elastomer is a new innovative synthesise process which can give an alternative to the conventional PUs manufacturing.

Furthermore, PU/clay nanocomposites based on palm oil polyol is a new formulised material. **RMC**

New Prospective Polyurethane/ Clay nanocomposites for Fire Retardant to Complying Sustainable Development



SEM micrograph of PU/clay nanocomposites



PU/clay nanocomposites

● **SILVER** International Invention Innovation Industrial Design & Technology Exhibition (I-TEX 2007).
● **Bronze** UPM Invention, Research & Innovation Exhibition (PRPI 2006).



Sa'ari Mustapha, Teuku Rihayat, Mohd Hilmi Mahmood, Wan Md Zin Wan Yunus, Saraya Abd. Rashid and Khairul Zaman Hj. Mohd Dahlan

Reader Enquiry

Department of Chemical and Environmental Engineering, Faculty of Engineering, Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor, Malaysia
Tel: +603 8946 6303, 019 2088 241 E-mail: saari@eng.upm.edu.my



NewsBriefs

Reaching the Limit with the International Academic Writing Workshops

RMC had organised a series of International Academic Writing Workshops at the various faculties across UPM from October 2007 to January 2008.

The workshops were conducted to review and get feedbacks of the submitted manuscripts at the faculty level, learn and acquire the knowledge on the importance of English language as well as obtain tips on how to get the manuscripts published in the international impact factor journals.

They were twelve well known foreign consultants from different prominent international universities who were invited to give talks on their areas of specialisations with regard to academic writing.



The guest consultants were Prof. Emeritus Gary N. Mclean (Texas A&M University, USA), Prof. Kadambot Siddiqe (University of Western Australia, Perth), Prof. Anthony Leong (University of Newcastle, Australia), Prof. Mark P. Orbe (Western Michigan University, USA), Prof. Martin Snaith (University of Birmingham, UK), Ben Ramster (Telford Publishing, UK), Prof. Emeritus Paul B. Siegel (Virginia Polytechnic Institute & State University, USA), Prof. David B. Min (The Ohio State University, Columbia), Prof. Irene Ng (University of Exeter, UK), Prof. S. C. Dutta Roy (Indian Institute of Technology (IIT), India), Prof. Tomlinson, Pro Vice Chancellor of Research (University of Sheffield, UK), Prof. Peter Heggs (University of Manchester, UK).



The Most Recent Collaboration between UPM, UNITEN and KLIUC

The signing of a Memorandum of Understanding (MOU) between Universiti Putra Malaysia (UPM), Universiti Tenaga Nasional (UNITEN) and the Kuala Lumpur International University College (KLIUC) was witnessed by the Higher Education Minister, Datuk Mustapa Mohamed at Best Western Premier Seri Pacific Hotel, Kuala Lumpur.

The MOU was signed for a three-year R&D collaboration in energy and water, involving a RM10 million grant from the Higher Education Ministry.

According to Datuk Mustapa, it is hoped the collaboration would be a catalyst for other public and private institutions of higher learning as well as to encourage the research culture in institutions of higher learning.

The event was carried out in conjunction with Water and Energy National Forum 2008 that was held from 11- 12th February 2008.

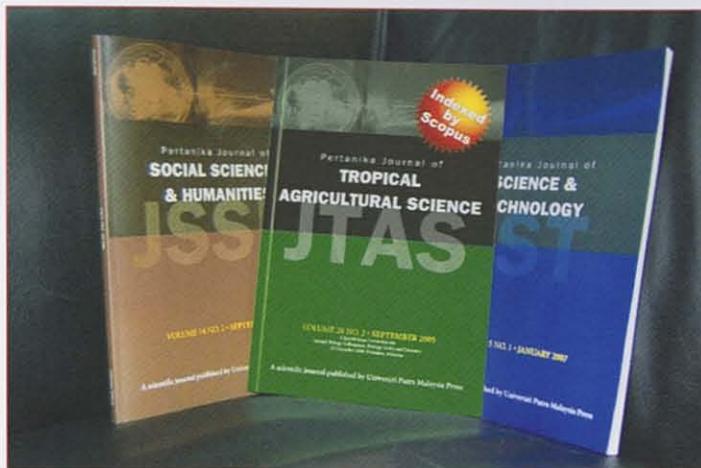
JAKIM- UPM to Lead Halal Improvement in Malaysia

The Halal Products Research Institute of UPM and Department of Islamic Development Malaysia (JAKIM) had signed a Memorandum of Understanding (MOU) which allowed a close collaboration and cooperation between the two parties to develop a halal products analysis laboratory.

The laboratory which to be set up at the Halal Management Complex at Bandar EinsteK Nilai, Negri Sembilan is estimated to cost around RM21million and will be ready by 2011. The development of the laboratory will enable more sophisticated, advanced and effective tests to determine the halal worthiness of any product.

UPM was represented by Vice Chancellor, Prof. Datuk Dr. Nik Mustapha Abdullah whilst JAKIM director general Datuk Wan Mohammad Sheikh Abdul Aziz signed on behalf of JAKIM.

The ceremony took place in Putrajaya on 12th February 2008.



The Honourable Pertanika!

The UPM hallmark journal, Pertanika marked its extraordinary history recently after 30 years of its publication in Malaysia.

The Pertanika Journal of Tropical Agriculture Science (JTAS), which was introduced in 1978 and one of the earliest journals in the country, received Majlis Penerbitan Ilmiah Malaysia (MAPIM) Special Award at the memorable MAPIM Award 2007 ceremony held in Putrajaya on 21st February 2008.

Prof. Dr. Tai Shzee Yew, the UPM Deputy Vice Chancellor of Industry and Community Relations received the award from the President of MAPIM, Prof. Dato' Dr. Hassan Said.

The award was introduced by MAPIM to encourage outstanding publications among the Public Institutions of Higher Education (IPTA) as well as the research based government agencies in Malaysia.

Pertanika which is exceptionally prominent amongst the Malaysian academicians and researchers consists of other series which include Journal of Science & Technology (JST) and Journal of Social Sciences & Humanities (JSSH). Pertanika JTAS obtained the Scopus citation index on 6th July 2007 within six months after the journal was revamped.

UPM Garners 30 Medals at MTE 2008!

UPM walked away as the biggest winner at the Malaysia Technology Expo (MTE) 2008 by winning 11 gold, 7 silver and 12 bronze medals; a total number that put UPM on the top list for the overall result.

The astonishing event was held at Putra World Trade Centre (PWTC), Kuala Lumpur from 21st – 23rd February 2008.

Gold medallist Prof. Dr. Faridah Abdullah from Science Faculty also won herself The Very Best Award for her pioneering research on Trichogreen® Increased Fruit Yield from Ganoderma- Infected Field and Initiated Early Flowering in Young Palms.

The theme for 7th MTE was "Technology ... it's Business" and was participated by an estimate 200 exhibitors from the government and private sectors.

Amongst the highlights at the exposition were Technology Engineering Innovation, Life Sciences Innovation, Consumer Tech Innovation and various R&D and Higher learning institutions.



Malam Gemilang Akademia Putra 2008

Malam Gemilang Akademia Putra 2008 was held successfully at Cyberview Lodge Resort and Spa, Cyberjaya on 26 February 2008 to commemorate the finalists and winners of Putra Teaching Excellence Award (APP) 2007.

The guest of honour for that night was Y. Bhg. Tan Sri Datuk Dr. Arshad Ayub. Also present were Prof. Datuk Dr. Nik Mustapha R. Abdullah, Prof. Datin Paduka Dr. Khatijah Mohd Yusoff and Prof. Dr. Tai Shzee Yew.

UPM's researcher Assoc. Prof. Ir. Dr. Mohd. Saleh Jaafar singled out as a winner for Engineering cluster, Prof. Dr. Abdul Hamid Abdul Rashid for Biosciences and Medical cluster and Assoc. Prof. Dr. Jayakaran Mukundan for Arts and Social Sciences cluster.

The winners were judged based on their good teaching record, innovative and high creativity in teaching as well as their contribution teaching and learning development.

The event was conducted in conjunction with the opening ceremony of the 2008 Bulan Putra SATRIA, UPM.

The table below shows the six finalists of APP 2007.

Finalist	Faculty
Abdul Hamid Abdul Rashid (Prof. Dr.)	Medicine and Health Science
Arbakariya Ariff (Prof. Dr.)	Biotechnology & Biomolecular Science
Mohd. Saleh Jaafar (A/P Ir. Dr.)	Engineering
Jayakaran Mukundan (A/P Dr.)	Educational Studies
Halimah Mohamed Kamari (Dr.)	Science
Ain Nadzimah Abdullah (Mrs)	Modern Language & Communication



Discovering the Biodiversity of Belum Valley

A memorandum of understanding (MOU) for building a RM78 million Belum Valley Biodiversity and Biotechnology Centre was signed between the Perak government and Universiti Putra Malaysia (UPM) on 28th February 2008 at Hillcity Hotel, Ipoh.

The centre will be set up to research and develop the natural resources of Royal Belum, one of the world's oldest tropical rainforest. The setting up of the research centre is also in line with the existing expertise in agro-bio and agriculture in UPM.



The signing ceremony was witnessed by Perak' Chief Minister Datuk Seri Mohamad Tajol Rosli Ghazali. UPM Vice Chancellor Prof Datuk Dr Nik Mustapha R. Abdullah signed on behalf UPM while the state was represented by YB. Dato's Dr. Abdul Rahman Hashim, the State's Secretary.

According to Datuk Dr. Nik Mustapha the UPM team will be focusing on natural products, including herbs found in the tropical rainforest.

Pertanika Welcomes New International Advisory Board Members

The Pertanika editorial board would like to welcome the two new members of Pertanika's International Advisory Board, Prof. Emeritus Dr. Manjit S. Kang and Prof. Dr. Kalidas D. Sen.

Prof. Manjit Kang is now on the International Advisory Board of Pertanika Journal of Tropical and Agricultural Science (JTAS). He currently serves as the Vice Chancellor of Punjab Agricultural University, India.



He has made outstanding contributions in Plant Breeding and Quantitative Genetics. His impressive credentials have deserved him many international honours and professional awards.

On the other hand, Prof. Kalidas Sen joined Pertanika as the International Advisory Board member of Pertanika Journal of Science and Technology (JST). He is a Professor in Chemistry at the University of Hyderabad, India and has served the university for more than 30 years.

His involvement in his area of expertise, Density Functional Theory and Confined Systems has allowed him to produce numerous exceptional publications. He also has won various international prestigious awards for his tremendous contributions.



Forthcoming International & National R&D Exhibitions April to October 2008

Exhibition	Date	Venue
Geneva- Palexpo	Apr 2-6, 2008	Geneva, Switzerland
APC: Research Award for Research Excellence	Apr 9, 2008	Equatorial Hotel, Bangi
HHIN 2008: National Intellectual Property Day Expo	Apr 26-30, 2008	Kuala Lumpur Convention Centre (KLCC)
KIWIE 2008: Korea International Women's Invention Exposition	May 8-10, 2008	Seoul, Korea
ITEX 2008: International Invention, Innovation and Technology Exhibition	May 9-11, 2008	Kuala Lumpur Convention Centre (KLCC)
INPEX 2008: Invention and New Product Exposition	June 11-14, 2008	Pittsburgh, USA
MIFB 2008: Malaysia International Food and Beverage Trade Fair	July 10-12, 2008	Putra World Trade Centre (PWTC), Kuala Lumpur
PRPI 2008: UPM Invention, Research and Innovation Exhibition	July 29-31, 2008	Banquet Hall, UPM
BIS 2008: British Invention Show	Oct 15-18, 2008	Alexandra Palace, London, U.K.

For the record

A New Deputy Director for a New Division of RMC



RMC is escalating its role to a more dynamic and efficient task force to sustain UPM's legacy as agriculture based university as well as to support the agriculture sector in Malaysia.

The centre is pleased to introduce its new division, **Agribio Resources Division** which has just started at the beginning of this year. The division is lead by Assoc. Prof. Dr. Mohd Said Saad as its deputy director.

Dr. Mohd. Said received his Bachelor in Agriculture from UPM in 1980. He completed his Master in Plant Breeding & Plant Genetics from the University of Wisconsin-Madison, US in 1983. Later in 1992, he was awarded with doctorate in Plant Genetic Resources and Plant Breeding from UPM. His areas of expertise include Biological Science, Biodiversity and Conservation and Genetic Diversity.

With such a solid agricultural background, RMC believes that Dr. Mohd. Said is the best person to bring Agribio Resources into a robust division!

Assoc. Prof. Dr. Mohd Said Saad
Deputy Director
Agribio Resources Division

New Staff for Publication Division, RMC



Diyana earned her Diploma of Engineering Technology in Computer and Networking from Universiti Kuala Lumpur-Malaysia France Institute under MARA scholarship in 2004. In 2008, she was awarded with an Australian degree in Bachelor of Arts (*Mass Communications*) majoring in Corporate Production from Curtin University of Technology.

Her interest in visual writing, film and television as well as public relations had deserved her several dean's awards throughout her studies. In 2007, she and her film production team was awarded with Anugerah Filem Pendek (AFP) 2006 Jury Special Award for Best Cinematography (*Anugerah Khas Juri – Sinematographi Terbaik*) during the 2006 Short Film Award organised by Radio Television Malaysia (RTM) for their short documentary "Grandma Inyak".

Currently, Diyana is the Sub-editor of the R&D bulletin of UPM, Synthesis. She can be reached at 03 8946 7838 or via email at diyana.kasimon@gmail.com.

Diyana Nawar Kasimon
Publication Officer
Publication Division

Ms Erica Kwan Lee Yin obtained her B.A (Hons) from Universiti Kebangsaan Malaysia (UKM) in 1999. She also graduated from the same University with a Diploma of Education in 2000. Later, she pursued her postgraduate study in Serdang at Universiti Putra Malaysia (UPM) and completed her M.A in English Studies majoring in Applied Linguistics in November 2007. Her area of specialization is in Second Language Acquisition.

Erica has eight years of experience working as an editor in a local publishing house. Throughout her working life, she had published English work books for primary and secondary schools both in Singapore and Malaysia.

Erica is currently assisting the Executive Editor in managing the *Pertanika* journals. She can be reached at 03 8946 7838 or via email at ericakwn@yahoo.com

Erica Kwan Lee Yin
Publication Officer
Publication Division



New Staff for Research Management Centre



Nor Khirma Amie Safiee
Administrative Assistant
Research & Innovation Division



Nasreena Hailani
Assistant Admin Officer
Promotion Division



Nazirah Mohd Sahami
Administrative Assistant
Knowledge Management Division

TECHNOFUND

Realising the importance of R&D and innovation, the Government has initiated TechnoFund, to undertake pre-commercialisation of new and/or cutting edge technologies in the Ninth Malaysia Plan (2006 – 2010).

TechnoFund is a competitive funding to carry out development of new and/or cutting edge technologies in six (6) technology clusters, 1) Agriculture, 2) Biotechnology, 3) Information and Communication Technology (ICT), 4) Industry, 5) Sea to Space, and 6) S&T services. Applications submitted must have the commercial potential to create new businesses and generate economic wealth for Malaysia.

TechnoFund serves as a bridging fund to address the funding gap exists between the earlier basic research stage and the commercialisation stage. Researchers are encouraged to collaborate with industry partners to undertake joint collaboration.

All applications should be sent to Innovation and Commercialisation Centre (ICC) and ICC will forward the applications to TechnoFund Secretariat, MOSTI. Researchers are advised to bring along the collaborator to ICC to fine tune the proposals and sign MoU between UPM and collaborator before applications can be made.

Five UPM Technofund applications have been approved amounting to RM19.7 million.

1. Biofil- Biofilter Technology for Waste Treatment



This project was awarded with RM 1.9 million in December 2007. It was developed by Prof. Azni Idris from the Department of Chemical and Environmental Engineering, UPM, together with its collaborator, Pakar Management Technology (M) Sdn. Bhd.

The product which is developed at commercially ready scale is a biological filter wastewater treatment called Biofil System; a waste treatment system based on novel process of utilising the well known microbial attached growth of fixed film process.

The objective of the product is to create a waste water treatment plant utilising Biofilter Technology as the main process unit and also to develop a compact, high rate and lucrative system which can comply with the strictest environmental standards and is also cost-effective to the manufacturers.



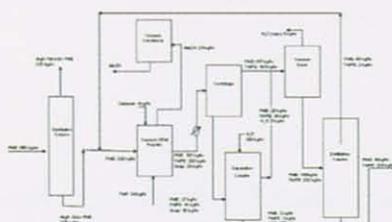
2. Integrated Production of Biolubricant and Biofuel from Renewable Resources



The collaboration between the Department of Chemical and Environmental Engineering, UPM and Solution Engineering Holding Sdn. Bhd has deserved Assoc. Prof. Dr. Robiah Yunus a grant worth RM 4.5 million in December 2007.

The plant based lubricant is a new class of bio-based synthetic lubricant that shows excellent lubricant performance with high bio-degradability. The product offers cost effective alternative based stock for applicants that require a lubricant capability of withstanding temperature over 100°C. This technology involves the production of plant-based lubricant methyl esters (biodiesel) and plant based lubricant which is carried out in an integrated chemical plant.

The main objective of the project is to establish process and plant design for integrated pilot plant production of biolubricant and also to produce a biolubricant, based on optimised operating conditions.



SOLUTION

Pertanika

Our goal is to bring high quality research to the widest possible audience

Pertanika is an international peer-reviewed leading journal in Malaysia which began publication in 1978. The journal publishes in three different areas — Journal of Tropical Agricultural Science (JTAS); Journal of Science and Technology (JST); and Journal of Social Sciences and Humanities (JSSH).

JTAS is devoted to the publication of original papers that serves as a forum for practical approaches to improving quality in issues pertaining to tropical agricultural research or related fields of study. It is published twice a year in **February** and **August**.

JST caters for science and engineering research or related fields of study. It is published twice a year in **January** and **July**.

JSSH deals in research or theories in social sciences and humanities research with a focus on emerging issues pertaining to the social and behavioural sciences as well as the humanities, particularly in the Asia Pacific region. It is published twice a year in **March** and **September**.



Call for Papers

Pertanika invites you to explore frontiers from all fields of science and technology to social sciences and humanities. You may contribute your scientific work for publishing in UPM's hallmark journals either as a *regular article*, *short communications*, or a *review article* in our forthcoming issues. Papers submitted to this journal must contain original results and must not be submitted elsewhere while being evaluated for the Pertanika Journals.

Submissions in English should be accompanied by an abstract not exceeding 300 words. Your manuscript should be no more than 6,000 words or 10-12 printed pages, including notes and abstract. Submissions should conform to the Pertanika style, which is available at www.rmc.upm.edu.my/pertanika or by mail or email upon request.

Papers should be double-spaced 12 point type (Times New Roman fonts preferred). The first page should include the title of the article but no author information. Page 2 should repeat the title of the article together with the names and contact information of the corresponding author as well as all the other authors. Page 3 should contain the abstract only. Page 4 and subsequent pages to have the text - Acknowledgments - References - Tables - Legends to figures - Figures, etc.

Questions regarding submissions should only be directed to the Executive Editor, Pertanika Journals.

Remember, *Pertanika is the resource to support you in strengthening research and research management capacity.*



**An Award Winning
International-Malaysian Journal**

FEB. 2008

Why should you publish in Pertanika Journals?

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Our journals have a 30% rejection rate of its submitted manuscripts, many of the papers fail on account of their substandard presentation and language (frustrating the peer reviewers).



Mail your submissions to:

The Executive Editor
Pertanika Journals
Research Management Centre (RMC)
Publication Division
4th Floor, Administration Building
Universiti Putra Malaysia
43400 UPM, Serdang, Selangor, Malaysia

Tel: +603-8946 6192
ndeeps@admin.upm.edu.my
www.rmc.upm.edu.my/pertanika

3. Novel Analyte Products for a Safe and Healthy Chicken



Granted with RM 2 million, Prof. Dr. Hair Bejo from Dept of Pathology-Microbiology, Faculty of Veterinary Medicine, UPM and Punca Cemerlang Sdn. Bhd have established analyte products for a safe and healthy chicken.

Chicken industries have become as one of the most important industries worldwide. The recent increase in production cost and outbreak of highly pathogenic Avian Influenza has threatened the industry.

Electrochemical (ECA) products was developed based on holistic approach of water treatment, nutrient for formulation and specific feeding program or specific application for growth and anti-stress in chicken and disinfect poultry houses and other facilities and equipment when are used at appropriate concentration formulation. Previously, *in vitro* studies showed that ECA product killed Avian Influenza Virus (H5N3) within 30 second upon treatment and also the other three types of bacteria such as *Salmonell enteridis*, *E. coli*, and *Pseudomonas marscescenn* were killed within 30 second upon treatment with ECA products. Whereas *in vivo* Studies carried on experimental broiler chickens demonstrated that the product is safe and effective and acted as a growth promoter that increases the body weight of the treated chicken with the ECA products. The chicken appears to contain less fat and better texture as well as taste. The main objectives are to determine the safety and efficacy of ECA products in health productions status of broiler chickens and also the efficacy of ECA products to eliminate pathogens especially viruses and bacteria in the poultry houses.



4. Production of Coenzyme Q10 with Improved Bioavailability for Food Supplement from Tobacco Leaves



Assoc. Prof. Dr. Lai Oi Ming together with Black Gold Petroleum Sdn. Bhd were awarded with RM 5.3 million for a collaboration project on the production of coenzyme Q10 with improved bioavailability for food supplement from tobacco leaves.

The scenario of the supply of CoQ10 throughout the entire world market is not enough but the demand of this product is high especially in healthcare applications. Thus, the aim of the project is to increase the contribution to Malaysian GDP through economic wealth creation and global competitiveness by up scaling the process for producing CoQ10 based on the technology acquired by Black Gold Petroleum Sdn. Bhd. Also increasing the solubility and bioefficacy of the purified CoQ10 using enzymatic esterification process and nanotechnology for used in the food, healthcare and cosmetic industries and producing new value-added products which are solanesyl ferulate, which can be used in hypertensive or anti cancer agent.



BlackGold Ventures
www.blackgold.com.my

5. Application of High Powered Ultrasonic Technology for the Production of Non Genetically Modified Phospholipids and Functional Lipids from Palm Based Product



The project was funded with RM 5.9 million awarded to Dr. Tan Chin Ping from the Department of Food Technology, UPM collaborating with Nepline Sdn. Bhd. to develop high powered ultrasonic equipment for the phospholipids, a major group of food emulsier. Due to their amphiphilic character and endogenous nature, phospholipids also constitute and important raw material in the modern pharmaceutical industry and they are widely used in intravenous preparation for parenteral nutrients. Today the market value of these important ingredients is about Euro 6000 per kg. Palm oil products are known to contain substantial amount of lipid components. Most functional lipid such as the tococls, sterols and squalen are extracted from the fatty acid distillate (FAD) and deodorizer distillate (DOD), which are basically by products from deodorisation in vegetables oil refining.

High powered ultrasonic treatment may also provide an advantage to pre-concentrate phospholipids from palm-based raw material and some of the non polar and polar functional lipids in DOD. One of the objectives is to optimise and develop the large scale extraction and purification of phospholipids from ultrasound treated palm-based raw material using a pilot plant scale high-powered ultrasound processing equipment.



All other researchers are encouraged to apply for Technofund grant to commercialise or upscale their technologies/products to the market. Application is open throughout the year. For further information visit MOSTI website <http://ernd.mosti.gov.my/escience>

Synthesis BACKISSUES

MARCH 2006 — Issue 12, 1st Quarter



Editorial: Managing our Success
Spotlight: Towards a Research University
Research Highlight: UPM focuses on High-technology Agriculture—Professor Abu Bakar Salleh speaks his mind.....

Regulars

- ▷ Biochemical Markers for Resistance and Susceptibility to Fusarium Wilt Disease in Bananas
- ▷ COMBAT Armor™
- ▷ Dual Frequency Multi-purpose Microwave Liquid Moisture Sensor
- ▷ Educational Software and Textbook: Teaching and Learning University Introductory Calculus

- ▷ Dynamic Rate-based Virtual Clock Scheduler for Output Buffered IP Switches

Feature

- ▷ Malaysian Socio-Technical Disaster Model and Operational Guide Research Happenings
- ▷ UPM Research Awards 2006
- ▷ Malaysian Technology EXPO 2006
- ▷ Expo Industri Asas Tani (EIAT 2006)
- ▷ Down the Memory Lane—Newsmakers around the Campus

JUNE 2006 — Issue 13, 2nd Quarter



Editorial: UPM Invention & Research Exhibition 2005
Spotlight: Towards R&D Commercialisation
Research Highlight: Pushing Research to a New Level –
Rationalisation Exercise: Why do we from Research Institutes in the University?

Regulars

- ▷ Mesocarp-Specific Promoter for Oil Palm Genetic Modification
- ▷ BANG SYSTEM™ – Design and Commissioning of UPM Ballistic Automated Network Gun Systems for Ballistic Studies
- ▷ Direct Fermentation of Sago Starch to Various Commercial Products
- ▷ SaTri-A Gold

- ▷ The Human Security System (S 3000)
- ▷ Synthesis and Fabrication of NiZnCu ferrite Cores via Sol-gel Technique
- ▷ FluReal H9N2 Check, a Rapid Detection and Sub-typing Kit for Influenza Virus

Research Happenings

- ▷ I-TEX 2006
- ▷ National Intellectual Property Day (Expo Hari Intelek Negara 2006)
- ▷ Geneva-Palexpo 2006

Reportage

- ▷ NewsBriefs
- ▷ FactFile

SEPTEMBER 2006 — Issue 14, 3rd Quarter



Editorial: UPM continues its pursuit of excellence in education and research
Spotlight: University Rankings
Research Highlight: A New Centre to Promote Technology Transfer and Commercialisation – Innovation and Commercialisation Centre

Regulars

- ▷ Detection of Microsatellite Loci in Rhinoceros Beetle *Oryctes Rhinoceros* Using the Randomly Amplified Microsatellites (RAMS) Method
- ▷ Carbon Dioxide Enrichment Technique for the Lowland Controlled Environment System
- ▷ Mitozyme™: Natural Enzyme Supplement for Poultry

- ▷ LaSt 24: A Novel Nanocomposite -Based Controlled Release Formulation of Latex Stimulant
- ▷ MBzyme: Nanobiocatalyst as Catalyst for Green Organic Syntheses
- ▷ Cardamonin: a Drug-like Phytochemical with Anti-Inflammatory and Immunomodulatory Properties Research

Happenings

- ▷ Biotechnology Asia 2006
- ▷ Agrobio Exhibition 2006
- ▷ IPTA R&D Roadshow 2006
- ▷ INPEX International Show 2006

Reportage

- ▷ NewsBriefs
- ▷ FactFile

DECEMBER 2006 — Issue 15, 4th Quarter



Editorial: Managing Knowledge
Spotlight: Nation Building- the Role of Universities
Research Highlight: A New Centre to Promote Technology Transfer and Commercialisation – Innovation and Commercialisation Centre

Regulars

- ▷ King Grass (hybrid Pennisetum) Silages- Quality and Digestibility
- ▷ Improvement Technology for Cocoa Butter Extraction Using Supercritical Fluid
- ▷ Trans- Free- Palm- Based Fluid Shortening
- ▷ Bluetooth Smart Remote Control and Sensor System (BLUESS)
- ▷ RAWAT: Rainwater Harvester

- ▷ The Fabrication and Comparison of NiZn Ferrite Cores via Sol-gel Technique and Solid State Reaction

Happenings

- ▷ NATPRO 2006
- ▷ PRPI 2006

Reportage

- ▷ NewsBriefs
- ▷ FactFile

MARCH 2007 — Issue 16, 1st Quarter



Editorial: Indicators of Research University Performance
Spotlight: Web Presence & Development
Research Highlight: Towards World-class University- What does it take to be a prestigious research institute?

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- ▷ New Materials for our Industries: PANGIUM EDULE REINW. (Kepayang)- Any Takers for Development of Products?
- ▷ NMFerit™: Formulation- Tailoring of the Ni- Mg-Ca-Co-Cu-Zn-Fe Ferrite System to Attain Extremely Low Magnetic-Energy Loss for High-Frequency Application
- ▷ The Adoption of Econet: The Internet-Based Malaysian

- ▷ Ecotourism Network and Site Rating Expert System
- ▷ RF Coaxial Cavity for Ignition
- ▷ Developing Ergonomics Seat for Commercial Vehicle in Malaysia: A Concurrent Approach
- ▷ A Family of Parallel Explicit Group Iterative Algorithm on Shared Memory
- ▷ Multiprocessors (SMPs) Architecture

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- ▷ IENA 2006
- ▷ BIS 2006
- ▷ MAITREX 2006

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DECEMBER 2007 — Issue 17-19, 4th Quarter



Editorial: Realisation of Quality Research Management System
Spotlight: Reading a Scientific Paper
Research Highlight: Maximising Research Potential through Quality Academic Publishing- Experts from Six Prominent Global Universities Shares Their Experiences

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- ▷ A Computerised Digital Imaging Technique to Estimate Palm Oil Quality Based on Fruit Colour
- ▷ Natural Booster Kit for High Quality Microalgal Production
- ▷ A Long-term Triaxial Filtration Test System
- ▷ Oil Scan: Remote Oil Spill Detection, Classification and Trajectory

- ▷ An Enhanced Mobile IPv6 with Multicast Function and Hierarchical Design
- ▷ Why Children and Teenagers are Addicted to Computer Games? NEMD Model- Norma™ Engagement Multimedia Design Model

Happenings

- ▷ MTE 2007
- ▷ BIO International Convention 2007
- ▷ ITEX 2007
- ▷ INPEX 2007

Reportage

- ▷ NewsBriefs
- ▷ FactFile



Research Management Centre
UNIVERSITI PUTRA MALAYSIA