Synthesis

R&D Digest of Universiti Putra Malaysia

ISSN. 0127 – 9394 http://rmc.upm.edu.my/synthesis/ • Issue 15 • 4th Quarter • Dec. 2006

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RU: UPM has been designated as one of the country's Research Universities under the Ninth Malaysia Plan

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- *Econet*
- *Ergonomic seat for Commercial Vehicles*

Knowledge transcends borders — *Teaching and learning a critical success factor...*

"The RU status has put UPM a step forward in enhancing the teaching and learning process".— Professor Ir. Dr. Radin Umar Radin Sohadi, Deputy Vice Chancellor (Academic & International Affairs)

UPM's mission is to be a leading Centre of Learning and Research, contributing not only towards human advancement and discovery of knowledge but also to the creation of wealth and nation building. As UPM gears up towards a Research University (RU), many might think that all efforts and concentration will focus on extensive study and exploratory works and thus diluting the university core business, i.e. teaching and learning. However, this is not the case! With the RU status, believe it or not, it further enhances teaching and learning.

The RU status has put UPM a step forward in enhancing its image.....

Late last year, UPM has started its initiative on Learning Outcomes (LO) with main focus to produce quality graduates full with soft skill attributes that are essential in the working world. To ensure the success of LO and to produce such graduates require experienced lecturers both in research and professional experiences. By having strength in research and professional services, these lecturers are able to bring in not just the real world knowledge to the classroom but also real world projects, case studies and modules. This transformation and sharing of knowledge and experiences would enrich the learning process of the students as the teaching activities would generate their soft skill attributes. At the same time, they are given first hand insights into the real working world, hence, preparing the students to meet the expectations of the industry and the requirements in obtaining employment.

Secondly, the success of RU depends on the quality of the graduates getting nto the system. To successfully undertake research at Ph.D. level requires well-grounded students. Graduates who are provided with complete learning experience through formal knowledge acquisition in lecture halls,

■ *Turn to Page Eight*

King Grass *(hybrid Pennisetum)* Silages - Quality and Digestibility

H. Yaakub, T. Boon Chuan, J. Shokri and A.R. Alimon

Award Winner

King Grass *(Pennisetum purperium)* is a newly introduced pasture grass in Malaysia. The dry matter yield of this grass is very high but the quality of the forage is mostly dependent on its maturity stages and climatic conditions.

The quality of this herbage is high and the crude protein can reach 10%. It is palatable during early stage due to low lignin content and high sugar contents. In order to maintain the quality of this grass, one of the methods is to preserve the grass into silage. In general, silage is fermented, high moisture forage to be fed to ruminants (e.g. cattle and goat). Most often silage is made from grass,

■ *Turn to Page Four*

Editorial

Managing Knowledge!

Research Management Centre (RMC) has been entrusted to spearhead knowledge management in Universiti Putra Malaysia (UPM). Knowledge is one of the greatest assets in any organisation including UPM and owing to this huge responsibility, the Knowledge Management Unit is founded to be the caretaker.

"Knowledge is Power" is a commonly used phrase and concept, implying that with knowledge or education one's potential or abilities in life will probably increase. It is also used as a justification for a reluctance to share information as some form of advantage can be gained through the use or manipulation of uncommon knowledge.

Commercial knowledge (intellectual property) is protected through several means: e.g. secrecy, copyright, patents, etc. This protection is secured primarily to protect the original investment needed to create the knowledge while allowing the owners to obtain either a financial return or other advantage.

However, knowledge in itself is not power, the owner of the knowledge cannot usually realize any potential unless the knowledge is either used or shared.

Knowledge Management System (KMS) is a distributed hypermedia system for managing knowledge in UPM supporting creation, capture, storage and dissemination of expertise and knowledge. Knowledge in the case of KMS is the know-how of UPM. It is the proficiency UPM uses to operate, make important decisions, and set its strategic direction.

The idea of a KMS is to enable UPM employees to have access to the knowledge of facts, sources of information, and solutions. Having employees share their knowledge (in brains and files) could potentially lead to more effective problem solving and it could also lead to ideas for new or improved products and services.

The goal of a KMS is to get the right information to the right people at the right time. This will increase efficiency leading to a competitive advantage. Co-operative contributions from knowledge creators are very important to cultivate a culture of k-community.

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Photographs courtesy Ahmad Fua'ad Alwi & Nayan Kanwal

Spotlight

Nation Building— the Role of Universities

Research brings transformation and development and also enhances the quality of education. This sets in a regenerative cycle of excellence.

The Universities have a major responsibility in nation building through enriching science, engineering, technology, agriculture, and humanities by providing value based education to students to make them moral leaders.

Specifically Universiti Putra Malaysia has now been designated as one of the country's Research Universities (RU), thus the extent of the research work undertaken by the University becomes a measure of judgment and representation for UPM. Experience of research leads to quality teaching, and quality teaching imparted to the young in turn enriches the research and higher learning. Research brings transformation and development and also enhances the quality of education. This sets in a regenerative cycle of excellence. The quality of research and teaching will attract students from many parts of the country, creating new environment and base for development of the Nation.

The information technology and communication technology have already converged leading to Information and Communication Technology (ICT). Information Technology combined with bio-technology has led to bio-informatics. Now, Nanotechnology is knocking at our doors. It is the field of the future that will replace microelectronics and many fields with tremendous application potential in the areas of medicine, electronics and material science. When Nanotechnology and ICT meet, integrated silicon electronics, photonics are born and it can be said that material convergence will happen. With material convergence and biotechnology linked, a new science called Intelligent Bioscience will be born which would lead to a disease free, happy and more intelligent human habitat with longevity and high human capabilities. Convergence of bio-nano-info technologies can lead to the development of nano-robots. Nano-robots when they are injected into a patient, my expert friends say, will diagnose and deliver the treatment exclusively in the affected area and then the nano-robot gets digested as it is a DNA based product.

Convergence of ICT, Aerospace and Nanotechnologies will emerge and revolutionize the aerospace industry. This technological convergence will enable building of cost effective low weight, high payload, and highly reliable aerospace systems, which can be used for inter-planetary transportation.

There is a need for quality human resource in the country in all sectors of the economy namely agriculture, manufacturing and services. Since there is a mismatch between availability and the requirement of human resource, cost of hiring is going up, which is not sustainable in the long run. We have to face this challenge and the higher education system and the technical skill education system have to gear up to generate manpower with employable skills in quantity and quality at all levels. The education system has to be relevant to present day manpower needs and be sensitive to global changes that are taking place in every sector of the economy. The syllabus therefore requires review and change periodically keeping in mind the present and future development tasks.

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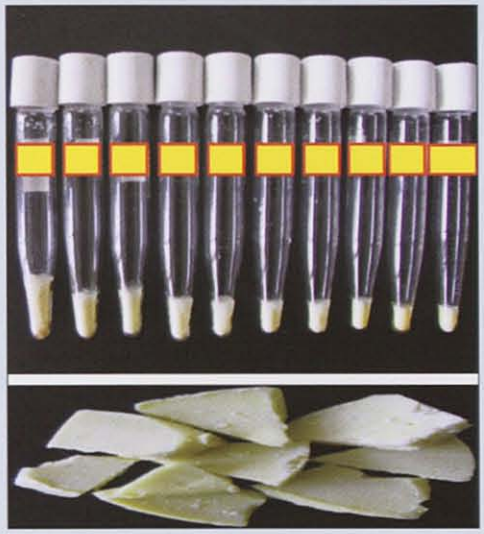
Improvement Technology for Cocoa Butter Extraction Using Supercritical Fluid

Award Winner

Jinap Selamat, Asep Edi Kusnadi, Russly Abdul Rahman, Harcharan Singh, Nazimah Sheikh Abdul Hamid and Tan Teng Ju

Cocoa beans consist mainly of cocoa butter (50-55 wt%). Cocoa butter is high in value (3,716.26USD/ tonne) and is highly demanded by food, cosmetic and pharmaceutical industries. Mechanical expression and solvent extraction with hexane are generally employed to obtain cocoa butter. The use of organic solvent is unattractive due its association with health and safety hazards while the expression often introduces contaminants into the cocoa butter that must be removed later.



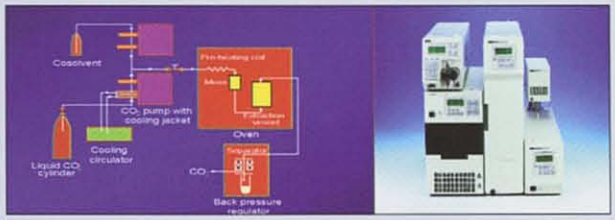
Extracted Cocoa Butter by SFE

Moreover, cocoa powder and liquor produced by expression still contained 10% fat, which does not provide benefit to the intended products such as beverages. The research attempts to produce cocoa powder containing low fat content to increase the economic value of cocoa secondary products.

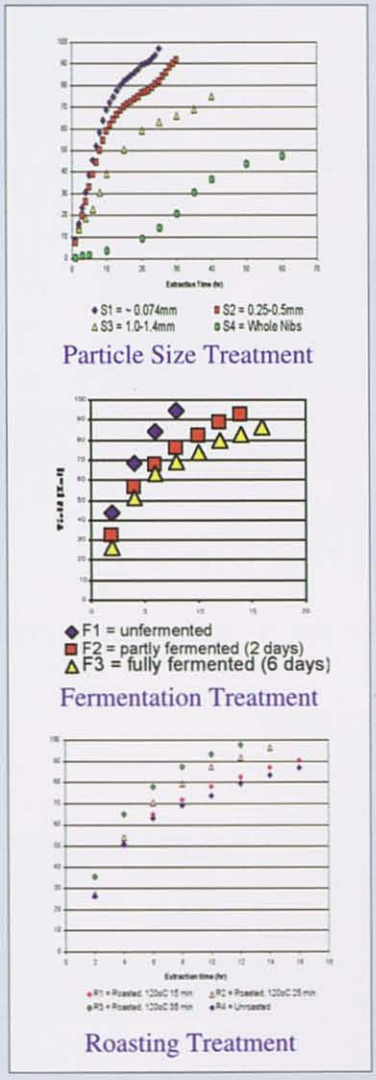
Supercritical fluid extraction (SFE) is a potential alternative to the customary methods of producing cocoa butter; it offers the advantages of rapid, non-toxic, environmental-friendly, contamination-free and easily manipulated conditions. The most desirable supercritical fluid solvent for extraction of natural products for foods by far is carbon dioxide (CO_2). It is an inert, inexpensive, easily available, non-toxic, non-flammable, odourless, tasteless, environmental-friendly and GRAS (generally regarded as safe) solvent. Furthermore, in supercritical fluid processing with CO_2, there is no solvent residue in the extract, since it is a gas in the ambient condition. The technique has overcome many drawbacks imposed by the conventional organic solvent-oriented extraction method. The yield of cocoa butter is much higher to give more profit for cocoa grinders and help to boost the cocoa industry.

The matrix of the cocoa beans can affect the recovery and quality of the cocoa butter extracted using SFE. This study was carried out to evaluate the role of particle size, and fermentation and roasting process of cocoa beans on cocoa butter extraction using supercritical fluid (SCF). The particle size study used cocoa liquor (D = 0.074mm), ground cocoa nib (D = 0.25-0.50mm, 1.0–1.2mm) and whole cocoa nibs using supercritical carbon dioxide (SC-CO_2). The study on fermentation used unfermented, partly fermented and fermented cocoa whereas roasting study used roasted and un-roasted cocoa nibs. Fermentation and roasting studies were conducted under the same operation conditions using SC-CO_2 but with 25% ethanol as co-solvent. Cocoa butter extracted from the three studies was analyzed for total fat content (%), triglycerides and fatty acid methyl ester.

The findings indicate that the highest cocoa butter yield (96.89 % cocoa butter in powder) was obtained from the smallest particle size, the unfermented and the roasted cocoa beans. At 35MPa, 60oC and flow rate of 2mLmin-1 of supercritical carbon dioxide (SC-CO_2), the extraction produced clear and uncontaminated cocoa butter and it did not change ($p<0.05$) the triglycerides and fatty acid composition of the extracted cocoa butter. Glycerol-1,3-Dipalmitate-2-Oleate (POP), Glycerol-1-Palmitate-2-Oleate-3-Stearate (POS), and Glycerol-1,3-Distearate-2-Oleate (SOS) account for most of the triglycerides, with POS (42.52-46.44%) being the major component. Palmitic, stearic and oleic were the main fatty acids in the extracted cocoa butter, with stearic showed the highest concentration (33.70-40.22%). SFE technology using CO_2 as main solvent, with or without the addition of co-solvent, has proved to be technically feasible in cocoa butter production.



Schematic Flow Diagram and SFE Apparatus (Jasco, Japan)



GOLD – *UPM Invention, Research & Innovation Exhibition (PRPI 2006).*

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Trans-Free Palm-Based Fluid Shortening

Award Winner

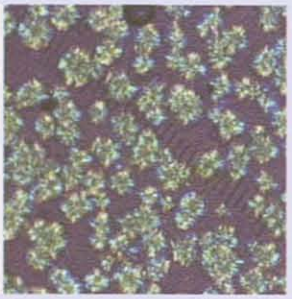
Yaakob Che Man, Miskandar Mat Sahri, Nor Aini Idris, Russly A. Rahman and Mohd Suria Affandi Yusoff

Conventional shortening, which is in plastic form, needs to be scooped or cut and weighed prior to usage. A unique method was developed for the production of trans-free palm-based fluid shortening. It is formulated from palm-based oils. Being flowable and pumpable at room temperature (25-30°C), the product invented could provide the functional properties of a solid shortening for baking and frying.

Trans free Palm-based Fluid Shortening

To achieve the desired characteristics careful selection of blend based on its solid fat content (SFC) and processing condition was carried out. The effects of temperature cycling on palm-based formulations with selected emulsifiers such as sorbitan tristerate (STS) and soy lecithin had successfully determined the optimum process conditions for a fluid shortening. The novel process developed in this study such as melting and stepwise cooling had produced the desired crystal type for a good fluid shortening. The crystals were homogenous in shape and size of 40 - 50 µm suspended in the liquid fats. The stability of the suspended crystal was very critical and had determined the fluidity and viscosity of the product. The fluid shortening had SFC of 3-5% and viscosity < 2500 cP at 30°C. It was comparable with the conventional solid shortening besides offering convenient medium for home cooking, baking and industrial frying.

Production of Palm-based Fluid Shortening



Homogenous crystal suspended in liquid is the criterion for good fluidity

GOLD – *UPM Invention, Research & Innovation Exhibition (PRPI 2006).*

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King Grass *(hybrid Pennisetum)* Silages - Quality and Digestibility

■ *From Page One*

Ten Weeks old King Grass

Chopped grass

Plastic barrel for storage

Digestibility trial

Prepared silage

Sheep : metabolism crate

whole cereal crops including corn (entire plant) or sorghum. It is fermented and stored in a silo or container under anaerobic condition, a process of making silage called ensilage. Once all the oxygen has been used, anaerobic lactic bacteria (which only function when there is no oxygen around) begin to multiply in numbers and turn sugars into lactic acid, which results in a drop in pH. A pH of about 4 preserves the silage, by preventing butyric fermentation. There are wide ranges of additives used to increase the chances of good silage fermentation. Additives can help when making silage from pasture which is not ideal (e.g. < 25% DM, low soluble sugar content).

In this study, the quality and the digestibility of the silage prepared from 10 weeks old King Grass without additives is compatible with an addition of additives.

GOLD – *UPM Invention, Research & Innovation Exhibition (PRPI 2006).*

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Bluetooth Smart Remote Control and Sensor System (BLUESS)

Mohd Hanif Yaacob, MN Saadat, MN Salleh, RKZ Sahbudin, BM Ali and S Khatun

Award Winner

Bluetooth Smart Remote Control and Sensor System (BLUESS) is a device capable of controlling appliances and machines wirelessly. It can also acquire data from sensors integrated to the system. BLUESS supports connection to multiple appliances. Thus, using only a unit of BLUESS, many electrical appliances, machines and sensors can be controlled remotely. This device is made up of generic low cost microcontroller and Bluetooth radio chip. Hence, it is capable of controlling any type of electrical appliances and machines. Based on Bluetooth technology, any authenticated mobile phone, personal digital assistant (PDA) or computer with Bluetooth protocol can be used as the master to control wirelessly the appliances up to 100m distance.

BLUESS: Bluetooth Smart Remote Control and Sensor System

BLUESS is ideal for any home or industrial applications requiring secure wireless control over remote hardware or multiple appliances. This is made possible since authentication is required between the master and the appliances before any communication is established. The device is also suitable for real time temperature and humidity monitoring especially items that are sensitive.

BLUESS can be used with various types of sensors. Fitted with a motion sensor, BLUESS acts as a security device capable of detecting intruder movement and automatically alerts the owner via Short Messaging System (SMS) text. The device is also integrated with a sensitive temperature sensor, which is capable of warning the owner of potential fire disaster automatically via SMS text if soaring heat is detected.

BLUESS: a device capable of controlling appliances and machines wirelessly

The main advantage of BLUESS is that it can control and monitor multiple electrical appliances remotely regardless of line of sight as in infra red based system. It is a low cost device that can be used widely for home, industry or office environments as its installation is simple and requires minimum maintenance. BLUESS is also compatible in its operation using any authenticated communication unit with Bluetooth. Installed with user friendly navigation software, BLUESS is considered as a Do-It-Yourself (DIY) device and can be handled without requiring high skill personnel.

GOLD – *World Exhibition of Innovation, Research & New Technologies (EUREKA 2005).*

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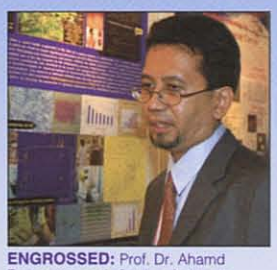
Research

NATPRO 2006 *(17-19 August 2006)*

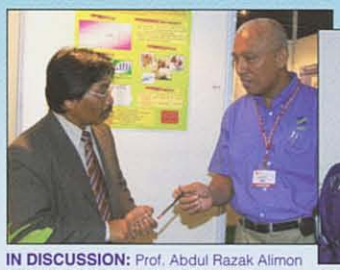
CUTTING THE RIBBON: MITI Deputy Minister YB Dato' Mah Siew Keong at the official launch of the Asia Pacific Natural Products Expo (NATPRO) 2007 held from 17-19 August 2006.

KEEN INTEREST: NAPTRO is the leading herbal and natural products exposition in Malaysia. Fifty-five exhibitors participated in NATPRO 2006 trade exposition which attracted about 3,400 visitors.



ENGROSSED: Prof. Dr. Ahamd Bustaman ready for the challenge during the NATPRO 2006.

UPM Invention, Research and Innovat



IN DISCUSSION: Prof. Abdul Razak Alimon impressing the judge with his innovative research during the PRPI 2006 show.

SMILING FACES: Dr. Raha a Basri sharing their happy mome exhibition.

UPM Invention, Research and Innovation Exhibition (PRPI 2006) *(22 –24 Aug 2006)*

UPM R&D CLUSTERS: UPM's prominent R&D clusters at display during the PRPI 2006 held from 22-24 August 2006.

KEEPING THE SPIRITS HIGH: Prof. Datin Paduka Dr. Khatijah Mohd. Yusoff receiving her award for her excellent contributions in research at UPM.

EXCHANGING VIEWS: Assoc. Prof. Dr. Makmom Abdullah sharing his view on his innovative research with the visitors.

OUTSTANDING IDEAS: Assoc. Prof Dr. Shameem Rafik-Galea briefing one of the judges about her research.

INQUISITIVE MIND: Prof. Da Sulaiman with a participant du one of the booths at PRPI 200

CONGRATULATIONS: Deputy Minister of Higher Education, Y.B Datuk Ong Tee Keat congratulating all the award winners.

SPECIAL TIES: *(from left)* – Prof. Dr. Abdul Halim Shaari, Assoc. Prof. Dr. Mohamed Othman and Assoc. Prof. Dr. Sidek Hj. Ab. Aziz— the front-liners!

NOBLE EFFORT: Prof Dr. Zulkifli Idrus *(left)* with Prof. Dr. Abu Bakar Salleh *(centre)* and the Deputy Minister of Higher Education, Y.B Datuk Ong Tee Keat

FOR THE RECORD: Hard work revealed!!

A PROUD STUDENT: A prou student with her Bronze medal outstanding research.

HUGE POTENTIAL: Y.B. Prof. Dr. Nik Mustapha taking a closer look at a R&D product of commercial potential.

NO LIMITS TO SUCCESS: Prof. Dr. Abu Bakar Salleh with Prof. Dr. Nik Mustapha during the PRPI 2006 show

CAPITALISING ON RESEARCH: One of the participants showing his research to Prof. Dr. Nik Mustapha and Prof. Dr. Zulkifli Idrus, Director, Research Management Centre (RMC).

LOCAL HERO: Y.B Prof. Dr. Abu Bakar Salleh, engrossed in an explanation by the researcher while Y.B. Prof. Dr. Nik Mustapha looks upon

LOOK OUT FOR A MAN WIT Prof. Dr. Ahmad Zubaidil Baharu the Faculty of Economics and Ma showcasing his research to the V

Happenings

Exhibition (PRPI 2006) *(22 –24 Aug 2006)*

f Mahiran
ring the

INFORMATIVE: A dedicated exhibitor explaining his research to the visitors.

HARDWORK: Ms. Low *(centre)* and other RMC staff are working hard for the success of the exhibition.

Mohd.
visit to

WELL-DONE: Prof. Dr. Zulkifli Idrus sharing new ideas with one of the exhibitors

ALL IN A DAY'S WORK: UPM's Board of Director, Y.B Tan Sri Dato' Seri Dr. Hj. Zainul Ariff and Deputy Vice Chancellor (Academic & International Affairs), Prof. Ir. Dr. Radin Umar sharing their words of wisdom!

graduate
for her

AWARD WINNERS: *(from left)* Prof. Ir. Radin Umar, A/Prof. Dr. Rozita Rosli, A/ Prof. Dr. Raha Abd. Rahim, Prof. Dr. Abu Bakar Salleh and A/Prof. Dr. Mariana Nor Sahmsudin

NOBODY FIXES IT BETTER: *(from left)* Prof. Zulkifli Idrus, YB. Prof. Dr. Nik Mustapha and A/Prof. Dr. Raha Abd. Rahim all for UPM!

NOUR:
from
nent

PASSIONATE: A/Prof. Dr. Ishak Aris *(right)* from the Faculty of Engineering with his ambitious ideas convincing the Vice Chancellor!

NOT AN EASY TASK: Prof. Dr. Jambari explaining his pioneering and innovative R&D exhibit to the judges

Down the Memory Lane *(Newsmakers around the campus)*

FOR THE RECORD: *(from left)* Prof. Dr. Mahiran Basri, A/ Prof. Dr. Raha, Prof. Dr. Abdul Halim Shaari and Mr. Rosmi Othman (InfoComm Development Centre).

RIDING ON GLOBALISATION: *(from left)* Prof. Dato' Dr. Shariff & Prof. Mohd. Shahwahid thinking aloud!

REGISTRATION: *(from right)* Dr. Nayan Kanwal, Prof Dr. Nor Aripin Shamaan and A/ Prof. Dr. Raha being signed for the Research Excellence Awards 2006 function

GRAND FESTIVITIES: Memories from the Hari Raya luncheon held at IDEAL Dining Hall, Centre of External Education.

READY FOR DESSERT: Ms. Low Ying Ying looks like she was ready for some desserts after the heavy meal.

MORE THAN JUST RESEARCH: Y.Bhg. Dato' Mustapa bin Mohamed, the Minister of Higher Education presenting the prize to Prof. Dato' Dr. Kamel Ariffin Mohd. Atan, Director INSPEM for his excellent contributions in research.

INTERNATIONAL REACH: Prof. Abbasali Amid Zanjani from University of Tehran receiving his memento during his official visit to UPM.

COMMITTED TO CAUSE: Prof. Dr. Kaida Khalid showcasing his GOLD award winning research which he won at the GENEVA-PALEXPO 2006.

FOR THE RECORD: Prof. Dr. Peter Agre *(centre)* with Tan Sri Dato' Seri Dr Zainur Ariff, Chairman, UPM Board of Directors *(on his right)* and Y.Bhg. Prof. Dr. Nik Mustapha *(on his left)* along with other dignitaries.

A COLLABORATION EVENT: Seeds of Change Exhibition, a UPM collaboration with Sokka Gakkai Malaysia, launched by Y.B. Prof. Dr. Nik Mustapha R. Abdullah

RAWAT: Rainwater Harvester

Megat Johari Megat Mohd. Noor, Thamer Ahmed Mohammed, Abdul Halim Ghazali

Award Winner

Although Malaysia is a tropical country with abundant rainfall, due to rapid development, there is an increasing demand on water supply particularly during the dry season. This led to water shortage in 1997.

Rainwater harvesting is an old practice but with improvement in technology, a new modern simple system is conceived with many potential benefits. The new rainwater harvesting system can produce safe water for potable and non-potable uses. Many trials had been made in Malaysia to use rainwater harvesting for domestic and non-domestic supplies but these trials concentrate on promoting the usage of the rainwater harvesting technique.

An innovative new system called rainwater harvester (RAWAT) is developed in UPM. The harvester is the first of its nature in Malaysia and is proposed for use with new housing projects. This unique system composes of gutters and down-pipes, first flush diverter, storage tank, pipes, and treatment unit. The tank of the rainwater harvester contains a series of inclined flexible sheets which help to increase the settling of particles carried by rainwater inside the tank. The treatment unit is attached to the tank and is composed of ultra violet (UV), activated carbon and filters.

A full-scale rainwater harvester was constructed at the Faculty of Engineering, Universiti Putra Malaysia to conduct research, mainly quantitative and qualitative analyses. The studies on the rainwater harvester will help to determine the system efficiency, visibility, and optimum sizes of components.

Rainwater harvesting tank and the treatment unit

The treatment unit

This innovative system will help the construction industry in Malaysia in overcoming the increasing demand on water supply. The finding of the research conducted on the rainwater harvester showed that the rainwater harvester is reliable and can provide a water volume of 3 m^3 of water during a single rain.

GOLD – *British Invention Show (BIS 2005).*

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■ *From Page One*

effective student centred learning activities and self development through the co-curricular activities will possess adequate knowledge, applicable skills and essential attributes that are crucially important to prepare for their post graduate studies as well as to ensure that they are able to complete their Master's Degree and Ph.D. successfully. On the same note, post graduate student is synonym to research and subsequently, it is one of the key performance indicators (KPI) of RU. Apart from that, supervision is also a part of the teaching and learning process. As such, teaching and learning would be a critical success factor. UPM realises this.

The RU status has put UPM a step forward in enhancing the teaching and learning process. The LO and soft skills initiatives, together with the SCL practices in the teaching and learning process would definitely support the government's aspiration to make Malaysia as an education hub in the near future.

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

Award Winner

Souilah Zahi, Mansor Hashim and A.R. Daud

The properties of ferrites are affected by micro-structural problems which have become the most serious obstacle in obtaining high quality reproducible ferrite. The Ni-Zn ferrites are very important soft ferrites which have been produced by the conventional method known as the solid state reaction which commercially involves both long and high temperature treatments for the oxides used in their preparation. The selection of these oxides often ends up with non-reproducible ferrites, mainly in term of their magnetic properties. Hence, the challenge is to obtain the optimum ferrites (Fig. 1) by making appropriate changes in the starting materials and consequently in the preparation. The newer sol-gel method has been previously proven to overcome problems of increasing the performance of the ferrites.

Presently, the Ni-Zn ferrites were prepared using two different methods; the sol-gel method and the conventional method which was also known as the solid state reaction using different starting materials as given respectively in Eq. 1 & 2. The solid state reaction is the classical method for powder preparation to form a compound or solid solution. The preparation starts with a mixture of raw materials and then calcining, pulverizing, granulating, pressing and sintering. The sintering is carried out at high temperatures, usually between 1200 and 1400 °C, depending on the ferrite type. In the sol-gel technique, small colloidal particles were first formed in solution and then linked

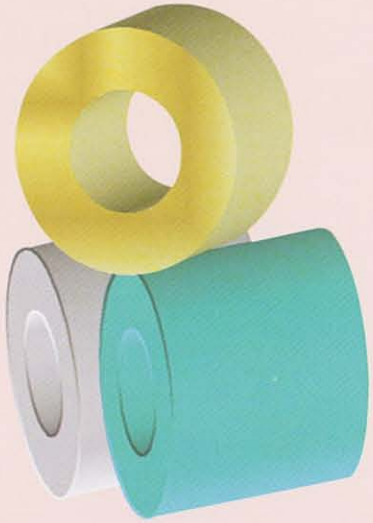


Fig. 1: *The fabricated ferrite cores*

to form a gel or were formed into ceramic particles by calcinations. The sol-gel method offers new interesting approaches to the preparation of ferrites.

$$0.3\ Ni(CH_3COO)_2 + 0.7\ Zn(CH3COO)_2 + 2\ Fe(CH_3COO)_3 \longrightarrow Ni_{0.3}Zn_{0.7}Fe_2O_4 \quad (1)$$

$$0.3\ NiO + 0.7\ ZnO + Fe_2O_4 \longrightarrow Ni_{0.3}Zn_{0.7}Fe_2O_4 \quad (2)$$

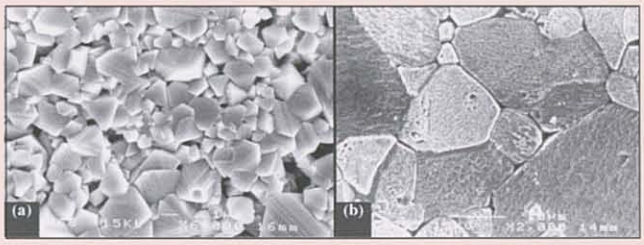
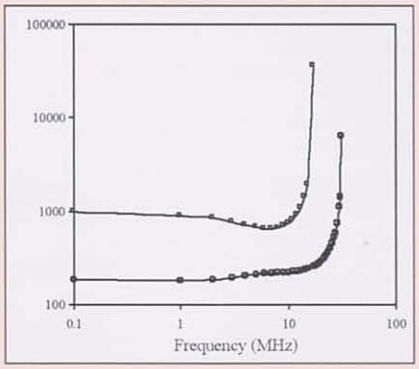


Fig. 2: The microstructure of the fabricated ferrites. (a) sol-gel; (b) solid state reaction

The comparison of the preparation methodology indicated that reduced temperatures and time in the sol-gel route saves energy and minimized the evaporation loss as well as the reaction with the containers that increases purity. The conventional mixing and milling steps were eliminated which indicated the finer particles. The microstructural comparison (Fig. 2) indicated the homogeneity and high purity in the sol-gel samples and the smaller grains confirmed the finer particles. The high electrical resistivity or the ability to control initial magnetic permeability (Fig. 3) with a small loss could be well obtained by the sol-gel technique. Similarly, the low porosity coupled with the high density, the required frequency band, high Curie temperature and mechanical hardness for wear stability could also be obtained through the sol-gel route.



Reader Enquiry

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NewsBriefs

Biotechnology Asia 2006 (9-11 August 2006)

Due to the wide application of biotechnology in various fields including agro-based, industrial, medical, health care and pharmaceutical, biotechnology plays as a catalyst for economic growth in Malaysia, as it generates a lucrative income for the nation.

The Biotechnology Asia 2006 was held at the Putra World Trade Centre, Kuala Lumpur, from 9-11 August 2006. It received tremendous support from global industry players, entrepreneurs, biotechnology companies, research institutions and universities. The event aimed to promote biotechnology among the public and enhance development in the industry as well as to provide local scientists a chance to network with their counterparts from around the region in commercializing their innovative products. The highlight of the event was the Innovation Awards that were presented to the researchers for recognizing their contributions and outstanding achievements of their innovative products through biotechnology application.

It was a triumph for UPM delegation when the entire 9 exhibits displayed by them garnered awards, comprising **1 Gold** medal, **2 Silver** medals and **6 Bronze** medals. In addition, UPM also received a "special award" for the **Best Booth Design** category.

Prof. Dr. Maziah Mahmood from Biotechnology and Bimolecular Sciences received a **Gold** medal for her innovative research entitled, "Phenylalanine Ammonia Lyase, a novel marker for color in commercial orchids". While, Assoc. Prof. Dr. Rozita Rosli from Medicine and Health Sciences, received a **Silver** medal for her pioneering research, "DNA vaccine against Enterovirus 71". Prof. Dr. Mohd Zobir bin Hussein from Institute of Advanced Technology (ITMA) won another **Silver** medal for his novel research, "Synthesis of novel Glutamate-Zinc-Aluminium-layered double hydroxide nanobiocomposites".
The recipients of Bronze medals are given below:

	AWARD	RECIPIENT
1.	Bronze	Mohd Zobir bin Hussein *(Prof. Dr.)*
2.	Bronze	Anuar Kassim *(Prof. Dr.)*
3.	Bronze	Raja Noor Zaliha Raja Abdul Rahman *(Assoc. Prof. Dr.)*
4.	Bronze	Siti Shapor Siraj *(Assoc. Prof. Dr.)*
5.	Bronze	Amin Ismail *(Assoc. Prof. Dr.)*
6.	Bronze	Rosfarizan Mohamad *(Dr.)*

NATPRO 2006 *(17-19 August 2006)*

The 3rd Asia Pacific Natural Products Expo 2006 (NATPRO 2006) was held from 17-19 August 2006 at Putra World Trade Centre, Kuala Lumpur, Malaysia.

NATPRO has been recognized as an integrated marketing platform to congregate industry players, investors, venture capitalists, technopreneurs and researchers of herbal and natural products. NATPRO creates a ground for researchers to explore new markets as well as to expand the global trading opportunities by having chance to network with their counterparts in commercializing their innovative products. Following are the 4 exhibits displayed by UPM:

	EXHIBIT	RESEARCHER
1.	Product Nutraceutical Rice Bran (GBR)	Maznah Ismail *(Prof. Dr.)*
2.	A Natural Compound, Isolated and Purified From a Local Herbal Plant, Interferes Cervical Intraepithelial Neoplasias Progression	Ahmad Bustaman Abdul *(Assoc. Prof. Dr.)*
3.	AzaC ® A Great Potential In Prevention of Cervical Cancer	Fauziah Othman *(Assoc. Prof. Dr.)*
4.	MELICOPE PTELEFOLIA: A Natural Inhibitor of Inflammation and a Potential Antioxidant for Commercial Exploitation	Khozirah Shaari *(Assoc. Prof. Dr.)*

UPM Invention, Research and Innovation Exhibition 2006 (PRPI 2006) *(22-24 Aug2006)*

The 7th Invention, Research and Innovation Exhibition (PRPI 2006) was held successfully from **22nd to 24th** August 2006 at the Sultan Salahuddin Abdul Aziz Shah Cultural & Arts Centre, UPM or commonly known as the Great Hall. It was organized by the Research Management Centre (RMC), Universiti Putra Malaysia.

PRPI is an annual activity at UPM where researchers are given a chance to exhibit their innovative R&D products. This year, there were 618 R&D exhibits from 26 Faculties/Institutes/Centres/Academies from across the campus that were displayed by various researchers. The exhibition aims to display research and development (R&D) achievements in various fields as well as to discover new talents, provide support and encouragement to new researchers for their continuing quest for research excellence at UPM. The exhibition also motivates UPM researchers to promote their research and participate in other exhibitions at both national and international levels. It also creates a platform for the scientists to commercialize their research. The university recognizes the participation of such researchers and rewards them with awards for their outstanding researches.

The event was officiated by the Deputy Minister of Ministry of Higher Education, Y. Bhg. Datuk Ong Tee Keat, UPM Vice-Chancellor, Y. Bhg. Prof. Dr. Nik Mustapha R. Abdullah and Y. Bhg. Tan Sri Dato' Seri Dr. Hj. Zainul Ariff bin Hj. Hussain, Chairman of the University Board of Directors.

Out of the 618 exhibits displayed by UPM researchers, 461 or 75% of the total participants had won medals, comprising of **56 Gold, 157 Silver and 248 Bronze** medals.

In addition, 9 special awards were presented to outstanding researchers by prestigious organizations like EUREKA (World Exhibition on Innovation, Research & New Technologies), Belgium, INPEX (Invention and New Product Exposition), United States, IENA (International Trade Fair of Ideas, Inventions, New Products), Germany, and PETA (Malaysian Agricultural Economics Association). The recipients of special awards are given below:

	SPECIAL AWARD RECIPIENT	PRESENTER
1.	Noorhana Yahya *(Dr.)* *Faculty of Science*	EUREKA
2.	Shamsul Bahri Hj. Mohd *(Dr.)* *Faculty of Medicine and Health Sciences*	INPEX
3.	Norihan Salleh *(Assoc. Prof. Dr.)* *Faculty of Biotechnology and Biomolecular Sciences*	IENA
4.	Mohd Ghazali Mohayidin *(Prof. Dr.)* *Faculty of Agriculture*	PETA
5.	Azali Mohamed *(Prof. Dr.)* *Faculty of Economics and Management*	PETA
6.	Murali Sambasivan *(Assoc. Prof. Dr.)* *Faculty of Economics and Management*	PETA
7.	Tan Hui Boon *(Assoc. Prof. Dr.)* *Faculty of Economics and Management*	PETA
8.	Law Siong Hook *(Dr.)* *Faculty of Economics and Management*	PETA
9.	Abdullahi Farah Ahmed *(Mr.)* *Faculty of Agriculture*	PETA

FactFile

For the record

Pertanika Revamps!

Pertanika will be a revamped journal with new editorial board, new guidelines, polices and even a brand new cover reflecting the change with effect from January 2007! Pertanika would be the resource to support you in strengthening research and research management capacity.

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

JTAS will be 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- agricultural biotechnology; biochemistry; biology; ecology; fisheries; forestry; food sciences; genetics; microbiology; pathology and management; physiology; plant and animal sciences; production of plants and animals of economic importance; veterinary medicine, or related fields of study. It will be published twice a year in February and August.

JST will cater for science and engineering research- bioinformatics; bioscience; biotechnology and bio-molecular sciences; chemistry; computer science; ecology; engineering; engineering design; environmental control and management; mathematics and statistics; medicine and health sciences; nanotechnology; physics; safety and emergency management, or related fields of study. It would be published twice a year in January and July.

JSSH would deal in research or theories in social sciences and humanities research-accounting; agricultural and resource economics; anthropology; business studies; communications; community and peace studies; design and architecture; disaster and crisis management; economics; education; language education; language acquisition; extension studies; finance; gerontology; human ecology; humanities; management; marketing; modern languages; psychology; safety and environment; social and behavioral sciences; and sociology, or related fields of study. JSSH aims to develop as a flagship journal for the Social Sciences with a focus on emerging issues pertaining to the social and behavioral sciences as well as the humanities, particularly in the Asia Pacific region. It will be published twice a year in March and September.

1 Ms. Haslida Hassan, Senior Assistant Registrar, Research Management Centre (RMC) has left the Centre with effect from 6 November 2006 to be with the Legal Division attached with the Registrar's Office, UPM. She could be contacted at haslida@putra.upm.edu.my

Ms. Haslida Hassan

2 As a part of RMC's upgrading and transformation program, the Centre welcomes the following new staff to its existing dynamic taskforce.

1. Mrs. Nor Hasriyanti Rahim, IT Officer, Knowledge Management Unit,
2. Mrs. Noor Ashikin Mohamed Noh, Programmer, Knowledge Management Unit,
3. Ms. Herwani Ahmad Thahir, Admin Assistant, Knowledge Management Unit, RMC;
4. Mrs. Siti Radziah Mohamed @Mahmod, Admin Assistant, Publication Unit,
5. Ms. Nurdilla Zaini, Admin Assistant, Administration Unit,
6. Mr. Sebat Anak Mondoh, Admin Assistant, Promotion Unit,

3 The Centre also takes this opportunity to thank the following personnel for their valuable contribution who have either left or have been relocated with in the university.

1. Ms. Zuliana Zakaria, Assistant Registrar, Research Grant Unit, RMC — *left UPM;*
2. Mrs. Syasliana Mohamad, Research Officer, RMC — *relocated to ICC;*
3. Mr. Asrizam Esam, Research Officer, RMC — *relocated to ICC;*
4. Mr. Mohd. Razif Ahmad, Admin Assistant, RMC — *relocated to IBS;*

Check it out

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 newly referable hallmark journals either as a **regular article, short communications**, or a **review article** in our 2007/2008 issues.

Submissions should be accompanied by an abstract not exceeding 200-300 words and your manuscript should be no more than 6,000 words, including notes and abstract. Please indicate the total word count. Submissions should conform to the Pertanika style, which is available by mail or email upon request

Mail your submissions to Dr. Nayan KANWAL, Executive Editor, Pertanika, Research Management Centre (RMC), Publication Unit, 4th Floor, Administration Building, Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor, Malaysia, Tel: +603-8946 6192, E-mail: ndeeps@admin.upm.edu.my

Read this – a call for contributions!!

If you have any contributions comprising feature articles or research write-ups that you would like us to publish in the esteemed columns of Synthesis or any suggestions that you may wish to make for the forthcoming issues, please send them to: The Managing Editor, Synthesis, Publication Unit, Research Management Centre, 4th Floor, Administration Building, 43400 UPM, Serdang, Selangor, Malaysia or via the Internet to ndeeps@admin.upm.edu.my or rschinfo@admin.upm.edu.my The editor reserves the right to edit articles for clarity and space before publication.

A Glance at Research Inventions & Innovations at UPM[1]

Continued from Issue 14, 3rd Quarter (Sept. 2006)...

No.	Faculty/ Institute	Researcher	Innovation	Research Cluster	Project Number	Allocation
367.	Science and Environmental Studies	Wan Nor Azmin Sulaiman	Determination of the variation between the design flood and the actual flood in selected small urban-rural catchments	AFF	09-02-04-0768-EA001	RM155,348
368.	Science and Environmental Studies	Zaidan Abdul Wahab	Determination of the thermal diffusivity and conductivity of selected solid ceramic and polymer materials at elevated temperatures	SAE	09-02-04-0769-EA001	RM248,800
369.	Science and Environmental Studies	Zainal Abidin Sulaiman	Development and assessment of student centred multimedia interactive physics teaching learning modules	SAE	07-02-04-0743-EA001	RM155,800
370.	Science and Environmental Studies	Zainal Abidin Talib	Cu-doped CaO-P205 glasses for lasers	SAE	09-02-04-0815-EA001	RM78,000
371.	Science and Environmental Studies	Zainal Abidin Talib	Development of Piezoelctric-based Gas Sensor Devices Formed from Plasma Polymerized Films	SAE	09-02-04-0458 EA001	RM159,400
372.	Science and Environmental Studies	Zelina Zaiton Ibrahim	Development of a methodology for rapid assessment of the impact of water resource management options on saline intrusions in Malaysian Estuaries: Application to the Langat River	MEE	08-02-04-0615-EA001	RM94,560
373.	Science and Environmental Studies	Zolkepli Othman	Evaluation of plant extracts and concoctions for medicinal values HAS 09-02-04-0368 EA001	RM179,000		
374.	Science and Environmental Studies	Zulkarnain Zainal	Preparation and characterisation of cadmium chalgogenides thin films by pulse reversal technique for opto-electronicdevices	BAB	09-02-04-0771-EA001	RM252,000
375.	Science and Environmental Studies	Zulkarnain Zainal	Chemical and Electrochemical Synthesis of Binary and Ternary Metal Chalcogenides Film For Solar Cell Applications	SAE	09-02-04-0369 EA001	RM228,500
376.	Science and Environmental Studies	Zulkifly Abbas	PC-based Microwave reflectometer for dielectric measurements	SAE	09-02-04-0460 EA001	RM205,200
377.	Science and Environmental Studies	Zulkifly Abbas	Development of a propagation prediction tool for indoor wireless local area networks (WLANs)	SAE	09-02-04-0547 EA001	RM225,000
378.	UPM Bintulu SarawaK, Food & Agricultural Science	Muta Harah bt. Zakaria@Ya	Distribution, diversity and use of aquatic macrophytes	AFF	09-02-04-0679-EA001	RM212,000
379.	UPM Bintulu, Sarawak	Yiu Pang Hung Clean	Production of Commodity-chemicals from Sago Biomass Using Electro synthesis Method	MEE	09-02-04-0821-EA001	RM154,500
380.	Veterinary Medicine	Abd. Wahid Haron	Cryopreservation of immature bovine oocytes	AFF	01-02-04-0005 EA001	RM194,976
381.	Veterinary Medicine	Abdul Rahman Omar	Development of an effective diagnostic tool and novel vaccine against infectious bursal disease virus infection	AFF	01-02-04-0007 EA001	RM162,000
382.	Veterinary Medicine	Abdul Rahman Omar	Identification of chicken anemia virus genetic determinant (s) associated with virus attenuation and pathogenicity	BAB	09-02-04-0700-EA001	RM98,000
383.	Veterinary Medicine	Bashir Ahmad Fateh Mohamed	Disease resistant throughbred- Kuda padi cross : Development and performance	AFF	01-02-04-0571-EA001	RM174,752
384.	Veterinary Medicine	Ganapathy a/l Kannan	Characterization of local isolate of Mycoplasma synoviae	AFF	01-02-04-0043 EA001	RM172,600
385.	Veterinary Medicine	Habibah Binti Arshad	Isolation, Identification and Characterization of Local Isolates of Sporothrix schenckii	AFF	01-02-04-0393 EA001	RM173,856
386.	Veterinary Medicine	Hassan Bin Mohd. Daud	Development of polymerase chain reaction -based rapid diagnostic tool for Herpesvirus cyprini	AFF	01-02-04-0029 EA001	RM134,200
387.	Veterinary Medicine	Loqman Mohamad Yusof	Development of Biomaterials from locally available ruminant offal in reconstructive surgery	BAB	01-02-04-0396 EA001	RM198,000
388.	Veterinary Medicine	Mohamed Shariff bin Mohamed Din	Investigation on the use of freeze dried reagents in the Fast TargetÔ White Spot Virus Detection Kit	AFF	01-02-04-0069 EA001	RM147,580
389.	Veterinary Medicine	Mohd. Azmi bin Mohd. Lila	A Novel Genetically Engineered Virus-Vectored Immunocontraceptive Agent for the Control of Rat Pest Population and Transmission of Rat-to-human Zoonotic Diseases	AFF	01-02-04-0071 EA001	RM194,000
390.	Veterinary Medicine	Mohd. Hair Bejo	Holistic Approach on Molecular Characterization and Cellular Response to Infectious Bursal Disease Virus by Bioinformatics and nanotechniques	AFF	09-02-04-0822-EA001	RM172,000
391.	Veterinary Medicine	Mohd. Hair bin Bejo	Development of Vaccine and Diagnostic Kits for Infectious Bursal Disease in Poultry	AFF	01-02-04-0073 EA001	RM119,000
392.	Veterinary Medicine	Mohd. Hamami Sahri	Development of microwave density meter for wood products quality assessment	SAE	03-02-04-0154 EA001	RM199,560
393.	Veterinary Medicine	Mohd. Shahar @ Mohd. Shah bin Abdul Majid	Occurrence of Vancomycin Resistant Enterococcus (VRE) in chickens and its Molecular characterisation	AFF	01-02-04-0398 EA001	RM157,600
394.	Veterinary Medicine	Mohd. Zamri bin Saad	Equine herpes virus infection and its effect on performance of ponies and horses in Malaysia	AFF	01-02-04-0399 EA001	RM131,000

to be continued...

[1] **Data presented IRPA RM-8 (as at Cycle 1, 2004); Total 416 EAR Grants, sorted by PTJ & Name.**

†The description of the some of the above Inventions and Innovative research products available for commercialisation at UPM are contained in the books—"**R&D at UPM**: Creating New Frontiers of Innovative Research", First Edition, and "**R&D at UPM**: Research Snapshots", First Edition, ISSN. 1675-1248, Editors: Nayan Deep S. Kanwal, Mohd. Shahwahid Hj. Othman and Sidek Hj. Abd. Aziz, Published by Research Management Centre (RMC), UPM, available from Publications Unit, Administration Building, Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor Darul Ehsan, Malaysia, Tel: +603 8946 6028 / 8946 6192, Fax: +603 8942 6539, e-mail: rschinfo@admin.upm.edu.my

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- Pullulanase Type II from a Locally Isolated Bacterium, Bacillus spp H1.5
- UPM Radiowave Planner and Predictor (RPP): A GIS Based Cell Phone Signal Strength Predictor
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- The Human Security System (S 3000)
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Letters to the Editor

If you have any comments about the content of the publication or any contributions that you may wish to make for the forthcoming issues, please send them to: The Managing Editor, *Synthesis*, Publication Unit, Research Management Centre, 4th Floor, Administration Building, 43400 UPM, Serdang, Selangor, Malaysia or via the Internet to ndeeps@admin.upm.edu.my. The editor reserves the right to edit articles for clarity and space before publication.

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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-wining 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.

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