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

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Going Back to the Basics of ICT Services in UPM

Information and Communication Technology (ICT) plays an important role in knowledge-intensive organisations such as UPM. Top universities of the world allocate a large sum of their institutional budget for ICT investments every year. There is no doubt that ICT is an important tool to support the mission and vision of any university. ICT investments would enhance research competitiveness of a university through various knowledge processes that include the creation, access, distribution and application of knowledge. From a research perspective, this demands high performance computing, advanced networks, collaborative tools, large capacity storage and strategic data analytics.

ICT is a tool and the significance of ICT is not solely in the technologies but the possibilities that it provides for research as well as teaching and learning activities. Thus, a university's most valuable resource is its people. ICT should be made to work for the academia and not the other way around. As such, ICT investment, adoption and development should not be product-driven or hype-driven but requires a people centric approach.

Hence, the rationalisation of ICT services in UPM involves the centralisation of human resources and ICT systems that have the desires to tackle issues head on. The formation of distributed ICT zones throughout the campus with a centralised management in iDEC would provide front line ICT support to the academia in UPM. The ICT zone would also act as a form of help desk and liaison for iDEC.

With the ever increasing pressure to reduce cost, a central-led ICT entity would create a bird's-eye view to make the right choice of technology assessment and investment for UPM. The rationalisation allows the new ICT entity to deliver efficient commoditised service at reasonable risk and service level. In the future, ICT development project should be oriented towards the need and expectation of the academia whether to enhance core services, increase capacity or even to save money. Moving forward, iDEC would have to deliver the right tailored ICT services with the right budget and at the right time to meet the demands for reliable ICT support in the university.

Dr. Khairulmizam Samsudin
Deputy Director (Research and Academic Computing)
InfoComm Development Centre

HB MELAYU™ - An Instrument to Measure Social Character Traits

The Malays had begun to be influenced by the liberal-secular ideology brought by the Western powers when the latter started to colonise the Malay world at the beginning of the 15th Century, resulting in the gradual erosion of their cultural tradition which was totally based on Islamic teaching. The Malay maxim: "Culture is based on law and law is based on the Book of God (al-Qur'an)" is a testimony to the Malays' condition of fully embracing the Islamic teaching. The erosion of the cultural tradition began to affect their social character traits passed down from generation to generation causing them to lose their strength and Malay identity. This condition becomes more serious as globalisation, aided by the negative aspects of the internet, ICT and media, intensified further the influence of those negative elements, without filtering, censure and control, actions causing deeper erosion of the Malays' social characteristics and strengths.

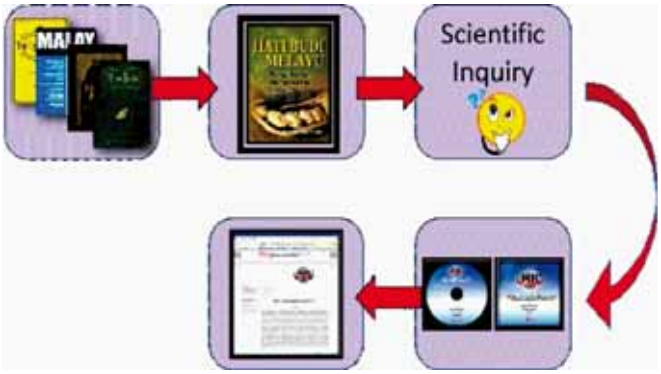
Expert's Snapshots

Hashim Musa is a Professor of Malay Linguistics in the Malay Language Department, Faculty of Modern Languages and Communication, Universiti Putra Malaysia since 2007, specialising in Malay linguistics, semantics, philosophy, ethics, Malay civilisation, Malay manuscripts, epigraphy and the Jawi writing system. He obtained his B. A. (Hons.) in Malay Studies in 1972 from the University of Malaya, M. A. in Malay Linguistics in 1975 from the University of Malaya and Ph.D from the University of Malaya also (1988) in morpho-syntax. He audited Ph.D courses at the Linguistic Department, University of California Berkeley in 1981. In 1995, he received a Fulbright Malaysian Islamic Scholar Award from Malaysian-American Commission on Educational Exchange to do research and gave lectures at the Department of Near Eastern Studies, University of California, Berkeley and the Department of Religion at the Temple University Pennsylvania, U.S.A. In 1999, he was appointed as a Visiting Senior Fellow/Professor at the International Institute for Asian Studies in Leiden, Holland to conduct research on Malay manuscripts kept in Holland. He has authored 30 books and more than a hundred academic articles and papers.

The present numerous social ills affecting the community, especially the younger generation are testimonies to this serious erosion, such as drug addiction, illegitimate sex, pregnancies and abandoning of babies, truancy, loafing, juvenile delinquency, crimes, gangsterism, bullying, illegal motor racing, and so on. The larger Malay community is also not spared from such negative influences causing the weakening of their traditional moral and ethical fortitude which leads to the occurrences of social ills such as greed for power, wealth and position, corruption, abuse of power and trust, money politics, disunity, mistrust, libel, wrongful accusation, mediocrity and dependency syndrome and others. All these social ills have undoubtedly affected and eroded the core social character traits of the Malays.

With that, HB MELAYU™ - An Instrument to Measure Malay Social Character Traits is specifically developed to evaluate and measure the condition of the present social character traits of the Malays as compared to their inherited core social character traits. This product is a self-diagnostic software programme that measures the degree of conformity or deviation of the present Malay social character traits against 26 core social character traits elicited from the tradition of the wise within the Malay community inherited from its golden past. These 26 traits as analysed and described in a book written by Prof. Dr. Hashim Musa Hati Budi Melayu: Pengukuhan Menghadapi Cabaran Abad ke-21 (2008) are elicited from traditional Malay literary genres such as proverbs, verses and maxims embodying the rules, regulations, exhortations and prohibitions in Malay daily life, considered to be the fundamental human components of the Malay civilisation.

HB Melayu™ is an innovative software that enables self-analysis of conformity or deviation of an individual's social character traits against the core social character traits of the Malays. Four main components are analysed to elicit the 26 core social traits of the Malay, namely epistemology, values, education/nurturing and religious belief. Each component has a set of about 50 questions and when a respondent answers each question by ticking a box out of five choices (1=totally disagree, 2=disagree, 3=not sure, 4=agree, 5=totally agree) , the programme will give a mark: 5 marks for the most correct answer descending to 1 mark for the most incorrect answer.



The program will automatically compute the score and the percentage of each component and finally total up the overall score when all the four components are fully answered and give the final grading, namely:

1. Score 80%-100% = excellent social character traits conforming to the core social character traits of the Malays
2. Score 60%-79% = good social character traits
3. Score 50%-59% = fair social character traits
4. Score 40%-49% = weak social character traits
5. Score 39% - below = eroded social character traits.

After identifying the intensity and types of weaknesses of their social character, suitable and relevant training programmes, motivation talks, workshops and seminars can be devised and developed to handle, overcome and realign their social element. The product is developed into two types of formats; diskettes and an interactive website. The potential customer may obtain it by means of purchasing the diskettes or by paying a fee to obtain the license for a password to go online on the website.

Figure 1: HB Melayu™ CD Software

The beneficiaries of the products are Malay communities in their homelands (e.g. Malaysia, Indonesia, Brunei, Singapore, South Thailand, South Philippines) as well as Malay diasporas worldwide (e.g. Australia, Cocoas Island, Sri Lanka, South Africa, UK, US,Vietnam, Kampuchea, Myanmar and the list goes on). To date the product is still in the prototype form and has not been produced on a large scale. The website is still being tested and needs several fine-tuning which can be done within a short time. Currently this is the only product in the market that can be used to measure social character traits of the Malay community. The product is an easy-to-use software which is embedded with a mechanism that can compute the results of an individual's scores automatically to show degrees of conformity or deviation of the respondent's social character traits against core social character traits of the Malays. There is also an interactive website that is easily accessible worldwide by paying a fee for a license to obtain the password to go on-line (http://172.18.15.44/hatibudi).

Related Awards

GOLD	*UPM Invention, Research & Innovation Exhibition (PRPI2011)*
SILVER	*International Exposition of Research and Innovation of Institutions of Higher Learning (PECIPTA 2011)*
SILVER	*International Innovation and Product Exposition (INPEX 2010)*
BRONZE	*UPM Invention, Research & Innovation Exhibition (PRPI 2009)*
GOLD	*UPM Invention, Research & Innovation Exhibition (PRPI 2008)*

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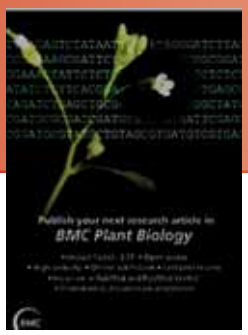

Mapping Quantitative Trait Loci (QTLs) for Fatty Acid Composition in an Interspecific Cross of Oil Palm

Title : Mapping Quantitative Trait Loci (QTLs) for Fatty Acid Composition in an Interspecific Cross of Oil Palm

Author(s) : R. Singh, **Tan Soon Guan**, J. M. Panandam, R. A. Rahman, C. L. Ooi, E. T. L. Low, M. Sharma, J. Jansen and S-C. Cheah

Journal : BMC Plant Biology 9, pp. 114

Impact Factor : 3.774

The oil palm is a perennial crop which belongs to the *genus Elaeis*. Within the genus *Elaeis*, two species are distinguished, the economically important oil palm (*Elaeis guineensis*) originally native to Africa and a South American relative, *Elaeis oleifera*. *E. guineensis* and *E. oleifera* hybridise readily, producing fertile offspring and thus suggesting a close relationship in spite of their different areas of origin. Although the current commercial species is *E. guineensis*, *E. oleifera* does possess certain attributes that are of interest to oil palm breeders. The characteristic of its mesocarp oil is especially of interest. The iodine value (IV, which is a measure of oil unsaturation) of *E. oleifera* oil can reach up to more than 90, compared to *E. guineensis* oil, which on average has an IV of 53.3. The fatty acid composition is also unique, as *E. oleifera* oil has high levels of oleic and linoleic acid and lower levels of the palmitic acid and other saturated fatty acids. It is only natural that an interspecific *E. oleifera* x *E. guineensis* hybrid programme is proposed as a breeding method to introgress genes for high oil unsaturation from the *E. oleifera* into the high oil yielding *E. guineensis*.

The development of marker-assisted selection (MAS) techniques would greatly facilitate hybrid-breeding programmes as well as speed up the development of planting materials with an oil composition high in unsaturated fatty acids (especially oleic fatty acid). With MAS, selection can be carried out in segregating generations of interspecific hybrids and their backcrosses more discriminately using molecular markers linked to the specific fatty acids.

To facilitate MAS, a genetic map was constructed using amplified fragment length polymorphism (AFLP), restriction fragment length polymorphism (RFLP) and simple sequence repeat (SSR) markers for an interspecific cross involving a Colombian *Elaeis oleifera* (UP1026) and a Nigerian *E. guinneensis* (T128). A framework map was generated for the male parent, T128, using Joinmap ver. 4.0 (Ooijen, 2006). In the paternal (E.guineensis) map, 252 markers (199 AFLP, 38 RFLP and 15 SSR) were ordered in 21 linkage groups (1815cM). Interval mapping and multiple-QTL model (MQM) mapping (also known as composite interval mapping, CIM) were used to detect quantitative trait loci (QTLs) controlling oil quality (measured in terms of iodine value and fatty acid composition). At a 5% genome-wide significance threshold level, QTLs associated with iodine value (IV), myristic acid (C14:0), palmitic acid (C16:0), palmitoleic acid (C16:1), stearic acid (C18:0), oleic acid (C18:1) and linoleic acid (C18:2) content were detected. One genomic region on Group 1 appeared to be influencing IV, C14:0, C16:0, C18:0 and C18:1 content. Significant QTL for C14:0, C16:1, C18:0 and C18:1 content was detected around the same locus on Group 15, thus revealing another major locus influencing fatty acid composition in oil palm. Additional QTL for C18:0 was detected on Group 3. A minor QTL for C18:2 was detected on Group 2. For the first time, this study revealed QTLs associated with fatty acid composition in oil palm. The traits were largely controlled by a limited number of genomic regions with large effects. QTLs for five traits (IV, C14:0, C16:0, C18:0 and C18:1) were located in Group 1. All traits showed similar shaped LOD profiles suggesting that the same QTL is influencing all five traits.

Related Publications

R. Singh, S. G. Tan, J. Panandam, M. Sharma and S. C. Cheah, 2007.. Preliminary Analysis of Quantitative Trait Loci Associated with Oil Quality in an Interspecific Cross of Oil Palm. Pertanika Journal of Tropical Agriculture. 30, 1, 31-44.

R. Singh, J. Nagappan, S. G. Tan, J. M. Panandam and S. C. C. Heah, 2007. Development of Simple Sequence Repeat (SSR) Markers for Oil Palm and Their Application in Genetic Mapping and Fingerprinting of Tissue Culture Clones. Asia Pacific Journal of Molecular Biology & Biotechnology. 15, 3, 121-131.

R. Singh, S. G. Tan, J. Panandam, R. A. Rahman and S. C. Cheah, 2008. Identification of cDNA-RFLP Markers and Their Use for Molecular Mapping in Oil Palm (Elaeis guineensis). Asia Pacific Journal of Molecular Biology & Biotechnology. 16, 3, 53-63.

Reader Enquiry

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Methicillin-resistant *Staphylococcus aureus* among Pigs and Pig Handlers in Malaysia

Title : Methicillin-resistant *Staphylococcus aureus* among Pigs and Pig Handlers in Malaysia

Author(s) : **Vasanthakumari Neela**, A.M. Zafrul, N. S.Mariana, A. van Belkum, K.L. Yun and E.G. Rad

Journal : Journal of Clinical Microbiology 47 (12), pp. 4139-4140

Impact Factor : 4.162

Methicillin-resistant *Staphylococcus aureus* (MRSA) primarily causes human diseases and has recently been identified in pigs and pig handlers in Denmark, The Netherlands, Canada and China. The transmission of pig-associated MRSA ST398 from pigs to pig handlers resulting in clinical implications has raised concerns about the role of this porcine reservoir in human infections worldwide. In Malaysia, several studies have reported the prevalence and characteristics of MRSA isolates from clinical and community settings. However, no data has yet been presented on MRSA in pigs. Therefore, we aim at determining the prevalence of MRSA colonisation in pigs and pig handlers in Malaysia.

Thirty randomly selected farms in the district of Kuala Langat from Selangor, Malaysia were sampled for MRSA. Twelve pigs of different ages and all workers from each farm were sampled for nasal carriage of MRSA. MRSA was isolated from the nasal swabs by standard protocols. MRSA positive isolates were molecular typed by staphylococcal protein A gene (*spa*) sequencing (http://spaserver.ridom.de), staphylococcal cassette chromosome mec (SCC*mec*) typing, and multilocus sequence typing (http://www.mlst.net). All isolates were screened for the virulence genes *pvl, fnb and cna, sea, seb, sec, sed, see, seg,tsst, eta,* and *etb*.

MRSA was isolated from one or more pigs on 30% (9/30) of the farms. The overall prevalence of MRSA among pigs was found to be 1.38% (5/360), with 5.3% (4/75) in weanlings and 1.3% (1/75) in grower-finishers. None of the piglets or sows was colonised. The prevalence of MRSA colonisation in humans was 5.5% (5/90). No MRSA was isolated from both pigs and pig handlers on any of the farms. Molecular typing showed that MRSA isolates belonged to two sequence types: ST9 (*spa* type t4358) and ST1 (*spa* type t1784). Except for strains from handlers on farm 12 and 29 (ST1), all other isolates were ST9. All isolates carried SCC*mec* V. Virulence gene analysis revealed enterotoxin genes, such as *seb* (60%), *see* (10%), and *seg* (90%), and microbial surface components recognising adhesive matrix molecules (MSCRAMMs) that included *Cna* (20%, only in ST1 isolates) and *Fnb* (100%). None of the MRSA isolates carried *pvl, eta, etb, tsst,* or enterotoxin genes other than *seb, see,* and *seg*.

To the best of our knowledge, our study reported on the isolation of MRSA ST9-t4358-SCC*mec* V from pigs and humans in the Asian region for the first time. The results from the current study showed that MRSA colonisation among pigs (1.38%) and pig handlers (5.5%) is lower in Malaysia than in the United States, The Netherlands, Canada, and Denmark. In contrast to most reports, Malaysian isolates are found to be ST9 and not the more common ST398. Surprisingly, we observed combined resistance against quinupristin-dalfopristine and tigecycline among isolates of both STs, despite not using quinupristin-dalfopristine or tigecycline for prophylaxis or as therapeutics in any of the farms sampled in this study. Virulence gene characterisation showed that the majority of the isolates carry enterotoxin encoding genes. Further characterisation of the strains needs to be carried out to understand the virulence potential of the enterotoxin genes in ST9.

In conclusion, we report on the first ST9 and ST1 MRSA isolates from pigs and pig handlers in Malaysia. Although the prevalence of MRSA is low outside Malaysian hospitals, the elevated incidence among pig handlers demonstrates the regional emergence of community-associated MRSA. The prevalence of MRSA in farm animals and handlers needs to be monitored continuously, as it may play a vital role in food safety and public health.

Related Awards

SILVER UPM Invention, Research & Innovation Exhibition (PRPI 2010)

BRONZE UPM Invention, Research & Innovation Exhibition (PRPI 2009)

Related Publications

E. Ghaznavi-Rad, M. N. Shamsudin, Z. Sekawi, Y. K. Liew, M. N. Aziz, R. A. Hamat, N. Othman,P. P. Chong, A. van Belkum, H. Ghasemzadeh-Moghaddam and V.Neela, 2010. Predominance and Emergence of Clones of Hospital-acquired Methicillin-resistant Staphylococcus aureus in Malaysia. Journal of Clinical Microbiology. Mar. 48, 3, 867-72.

Reader Enquiry

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Enhancing Muscular Strength Qualities in Untrained Women: Linear Versus Undulating Periodisation

Title : Enhancing Muscular Strength Qualities in Untrained Women:

Author(s) : **Kok Lian Yee,** P. Hamer and D. Bishop

Journal : Medicine & Science in Sports & Exercise, 41 (9), pp. 1797- 1807

Impact Factor: 3.707

It has been suggested that periodised resistance-training can improve muscular hypertrophy, strength and power. There are two basic periodisation models, namely linear periodisation (LP) and undulating periodisation (UP). LP is characterised by training that starts with high-volume and low-intensity exercises, whereby volume reduces as intensity is increased as the athlete/trainee works towards a peak in muscular performance, typically over a 10-12 week cycle. In contrast, UP, is a form of periodisation where each microcycle (weekly program) contain a day for hypertrophy, maximal strength and power respectively, with training volume and intensity changing on a daily basis.

A number of studies failed to equate training volume between comparative programmes, thus rendering comparisons problematic. Based on this, it is proposed that if volume (repetitions) and intensity are equal over a training period, subjects would achieve similar results regardless of the training structure used. However, other studies found that periodised programmes produced better results when repetitions are equalised and also when fewer repetitions are performed by the UP group. Possible reasons for the discrepancies above may be due to the different methods applied to estimate volume, the different intensities used during training, and or the varying training status of the subjects from different studies.

With the above discrepancies in mind, and also that few studies have examined the effects of periodised resistance-training on women, this study focussed on the efficacy of LP and UP protocols with matched workloads (one that varies training intensity and volume every 3 weeks and the other daily) in producing changes to upper- and lower-body strength adaptations in women. Twenty-four active females (20.0 ± 1.9 y) performed pre-training conditioning before being matched and randomly assigned to either LP or UP training. The LP group varied intensity and volume every 3 weeks while the UP group varied intensity and volume daily, with training performed 3 days per week for 9 weeks. Overall training volume and intensity was similar for both groups at the end of training.

At the end of the experimental period, there were significant improvements from the pre- to post-test in the arm and thigh girths, rectus femoris muscle cross-sectional area (CSA), 1-RM bench press and squats, average mechanical power output during the bench press throw and countermovement jump, but no significant differences were observed between groups except for muscle CSA. For women who participated in recreational and amateur level sports, but did not undertake resistance-training, both LP and UP seemed equally adept in improving strength qualities, suggesting that higher workloads and repetitions produce superior strength and power adaptations. Hypertrophic responses were larger and occurred earlier than previously reported, and are likely to be associated with the improvements in strength and power. Non-projected, light-load, explosive training was found capable of improving strength and power but should be limited to short periods, as continued use seemed to be detrimental to strength and power performances.

Figure 1: Resistance Exercises Used in the Studies

Reader Enquiry
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Breakthrough in the Isolation of Humic Substances

In spite of being ubiquitous and nature's most versatile compounds, the isolation of humic acids (HA) from humified substances such as organic and inorganic soils, coal, composts and other sources is laborious, time consuming, and expensive. Among the factors that economically affect the isolation of HA include extraction, fractionation, and purification periods. In this research, we developed a simple, rapid, and cost effective method for isolating HA from peat soil to facilitate production of organic fertilisers (humates) at a cheaper cost. Potassium and sodium hydroxides were used to isolate HA of various decomposed substances at 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, and 24 h extraction periods after which the samples (liquid obtained after centrifugation at 16,000 G for 15 minutes) were fractionated at 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, and 24 h using 6 M HCl. Samples were purified by washing them five times using distilled water instead of HCl, HF, and an expensive process called dialysis, which required 1 to 7 days to purify HA. Each purification period took 10 minutes. Standard procedures were used to confirm the purity and yield of HA. Optimum extraction, fractionation, and purification periods were obtained at 4, 2, and 1 h. Low ash (5%), remarkable reduction in K, coupled with the fact that C, E4/E6, carboxylic, phenolic, total acidity values, and spectral characteristics of the HA were consistent with those reported by other researchers who suggested that the HA were pure **(Figure 1)**. This was possible because the distilled water used served as Bronsted-Lowry acid during purification. A further attestation as shown in **Figure 2** was where the colour of the aliquots during purification was lighter than that of unpurified fulvic acids. An economic analysis indicates that the technology developed can reduce about 50% of the cost and time involved in HA isolation. This work will greatly facilitate commercial production of organically based N and K fertilisers.

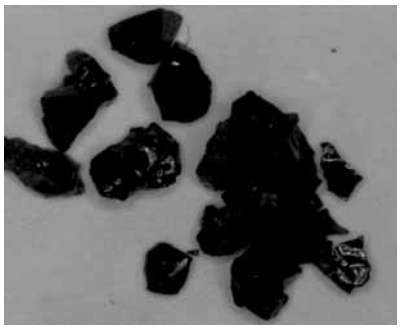

Figure 1: Pure Humic Acid Isolated from Peat Soil

Figure 2: The Effect of Purification on the Colour of Fulivic Acid

Related Awards

- **GOLD** *International Invention, Innovation and Technology Exhibition (ITEX 2010)*
- **GOLD** *International Trade Fair Ideas-Inventions-New Products (IENA 2009)*
- **GOLD** *Invention & New Product Exposition (INPEX 2008)*
- **GOLD** *UPM Invention, Research & Innovation Exhibition (PRPI 2010)*
- **GOLD** *UPM Invention, Research & Innovation Exhibition (PRPI 2009)*

Related Publications

O. Latifah, O. H. Ahmed and A.M. Nik Muhamad, 2011. Enhancing Nutrient Use Efficiency of Maize (Zea mays L.) from Mixing Urea with Zeolite and Peat Soil Water. International Journal of the Physical Sciences, 6, 14, 3330-3335.

H. Y. Ch'ng, O. H. Ahmed and A.M. Nik Muhamad, 2011. Qualitative Assessment of Soil Carbon in a Rehabilitated Forest Fourier Transfer Infrared Spectroscopy. The Scientific World Journal: TSW Environment, 11, 532-545.

O. H. Ahmed, C.H. Yap and A.M. Nik Muhamad, 2010. Minimizing Ammonia Loss from Urea through Mixing with Zeolite and Acid Sulphate Soil. International Journal of the Physical Sciences, 5, 14, 2198-2202.

O. H. Ahmed, N. A. Hasbullah and A.M. Nik Muhamad, 2010. Accumulation of Soil Carbon and phosphorus Contents of a Rehabilitated Forest. The Scientific World Journal: TSW Environment, 10, 1988-1995.

O. H. Ahmed, H. Aminuddin and M. H. A. Husni, 2008. Ammonia Volatilization and Ammonium Accumulation from Urea Mixed with Zeolite and Triple Superphosphate. Acta Agriculturæ Scandinavica Section B, Soil and Plant Science, 58, 2, 182-186.

Reader Enquiry

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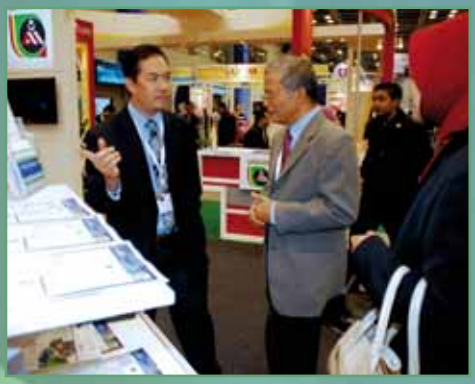
International Conference and Exposition on Inventions of Institutions of Higher Learning: Towards an Innovation-driven Economy

Presentations of Products, Inventions and Innovations at the Exhibition Booths



A Product Presentation by Assoc. Prof. Dr. Abdul Rashid Mohamed Shariff

Award-giving Ceremony

UPM INVENTS BIOREACTOR SYSTEM TO ACCERELATE ORCHID SEEDLINGS

A group of researchers from Universiti Putra Malaysia (UPM) has successfully produced a technology to increase flowering rate and production of orchid seedlings through the bioreactor system.

Head of research, Prof. Dr. Maziah Mahmood from the Biochemistry Department, Faculty of Biotechnology and Biomolecular Sciences, UPM said the bioreactor system uses tissue culture to accelerate the flowering process to increase the growth rate of orchid seedlings.

"This genetic transformation system enables orchids to be resistant to orchid diseases, to produce year round flowers with more vibrant colors and flowers that last longer and smell better. Apart from that, this technology helps to save the cost of fertilisation and orchid management," she added during the Putra Cipta UPM press conference organised by the Research Management Centre (RMC) and Office of Marketing and Communications (MarComm).

Prof. Dr. Maziah said that to date there is no such orchid development technology available in the Malaysian market as the present formula is on fertilisation. She further added that the technology which is sustainable and environmental friendly, facilitates orchid breeding due to a better aeration system and the technology does not require fertiliser and water. She also noted that the technology is suitable for small farmers, nursery owners and orchid enthusiasts. At the moment, UPM is still looking for distributors who are keen to market this technology.

Prof. Dr. Maziah Mahmood showing her product during the press conference of Putra Cipta UPM.

The research of 10 years on the technology which involved a total cost of about RM500 thousand, won a gold medal at the UPM Invention, Research and Innovation Exhibition (PRPI) in 2011, 2010, 2008 and 2007 respectively.

UPM GRABS 4 GOLD MEDALS IN PECIPTA

Four researchers of UPM bagged four gold medals at the 2011 International Expo of Research and Innovation for Institutions of Higher Learning (PECIPTA'11) which was held at the Kuala Lumpur Convention Centre on the 13th – 15th September 2011.

One of the gold medals went to Prof. Dato' Dr. Mohamed Shariff Mohamed Din from the Faculty of Veterinary Medicine for his product known as the "Immobilised Periphytic Microalgae (Oscibeads) for Rapid and Efficient Removal of Toxic Compounds from Water" which is to remove toxic compounds in water quickly and effectively and to be processed to generate biological fertiliser, animal feed and fuel.

Other gold medalists were the Director of Halal Products Research Institute, Prof. Dato' Dr. Yaakob Che Man with his product – HaFYS-Porcine DNA Test Kit which is able to detect pig DNA in an hour and Assoc. Prof. Dr. Vijayaletchumy Subramaniam from the Faculty of Modern Languages and Communication with her product known as the Phonic Tutor Software for Visually Dyslexic Students, which is a software that helps dyslexic students in learning Bahasa Malaysia. Another gold medal was won by Dr. Siti Aslina Hussain from the Faculty of Engineering with her product – Artificial Conduit for Coronary Heart Diseases which is a medical equipment to treat heart diseases, which functions as a transatrial aorto-coronary sinus in treating diffuse coronary atherosclerosis patients.

The exposition was officiated by YB Dato' Seri Mohamed Khaled Haji Nordin, Minister of Higher Education, Malaysia. UPM researchers won 7 silver medals and 11 bronze medals with a total of 22 medals won from the 25 researchers who participated in the exposition.

Among the researchers who won the silver medal were Assoc. Prof. Dr. Abdul Rashid Mohamed Shariff (Faculty of Engineering) with Integrated 3D Terrain Visualizer, Assoc. Prof. Dr. Ahmed Osumanu Haruna (Faculty of Agriculture and Food Sciences) with Breakthrough in Isolation of Humic Acids from Tropical Peats, Prof. Dr. Hashim Musa

Exhibition booths by the researchers of UPM.

(Faculty of Modern Languages and Communication) with How True Malay are You? An Instrument to Measure Social Character Traits, Dr. H'ng Paik San (Faculty of Forestry) with Optimum Bioconversion Process of Lignocellulosic Waste to Ethanol, Prof. Dr. Suhaila Mohamed (Institute of Bioscience) with A Novel Additive that Reduces Oil Absorption and Fat Deterioration in Food, Prof. Dr. Raja Noor Zaliha Raja Abd Rahman (Faculty of Biotechnology and Biomolecular Science) with Psychrozim: A Novel Cold Active Bifunctional Enzyme and Assoc. Prof. Dr. Sharifah Kharidah Syed Muhammad (Faculty of Food Science and Technology) with Natural Red-Purple Colourant from Dragon Fruit.

Some of the bronze medalists were Prof. Dr. Jamaloddin Noorzaei (Faculty of Engineering) with Development of 3-D Nonlinear Earthquake Resistance System for Framed Buildings, Assoc. Prof. Dr. Abd. Rahim Abu Talib (Faculty of Engineering) with Non-Penetrative Vacuum Blood Container, Dr. Mohd Nizar Hamidon (Faculty of Engineering) with Single Port Saw Resonator for High Temperature Passive System, Prof. Dr. Abdul Halim Shaari (Faculty of Science) with Novel Ceramic For Energy Storage and so on.

SOLAR ENERGY IN UPM TO FORM A CULTURE OF ATTENTIVENESS TOWARDS ENERGY CONSUMPTION

Universiti Putra Malaysia (UPM) launched a solar energy source that uses Concentrated Photovoltic (CPV) technology in its effort of creating an awareness of attentiveness towards energy consumption on campus.

The Vice Chancellor of UPM, Dato' Ir. Dr. Radin Umar Radin Sohadi said solar energy which is developed together with a joint company from China, Sichuan Zhonghan Solar Electric Power Co. Ltd. (Zhonghan), used CPV technology to determine a system that is suitable with the weather condition of this country.

"This project is one of UPM's initiatives to investigate alternative energy resources to enhance efficiency levels and cost-effective system technology capacity CPV in a commercial scale and develop Solar Energy Production Plant with the capacity to generate two megawatts of electricity. The pilot project will evaluate the effectiveness of the CPV system apart from determining a suitable system for the country's weather condition. This is in line with UPM's commitment in ensuring the conservation of the campus greenness and efficiency of energy consumption on campus," he further added.

He said that to reporters during the launching ceremony officiated by Datuk Seri Peter Chin Fah Kui, the Minister of Energy, Green Technology and Water, Malaysia recently. Also present at the launch was Chairman of Zhonghan, Mr. Liu Han. Zhonghan which is a major industry in green technology development ,also possesses expertise in solar technology.

Datuk Seri Peter Fah Kui, Ministry of Energy, Green Technology and Water officiates the launching ceremony.

Dato' Ir. Dr. Radin Umar also noted that solar energy that uses CPV technology is an up-to-date application and UPM is the only institution of higher learning from Asian including 10 other best universities in the world that use the technology. "This tool can reduce the number of Photovoltaic (PV) panel through the use of Contrator Glass at the rate of 50 percent and at the same time detects maximum level of radiation energy and insolation from the sun automatically," he said.

Natural Red-Purple Colourant from Dragon Fruit *(Hylocereus Polyrhizus)*

Product Description

- a natural red-purple colourant from dragon fruit (Hylocereus polyrhizus)
- prepared in the form of powder and can be utilised in food, drink, pharmaceutical, neutraceutical and cosmetic applications
- the powder is odourless, bland in taste and therefore, can be applied in many products
- the powder has high antioxidant activity and can be prepared in low and high fibre powders

Advantages

- replaces artificial colourant that gives pink to red-purple shades
- utilises as a functional food ingredient
- becomes an alternative to the red beet powder

Applications

- food, drink, pharmaceutical, neutraceutical and cosmetic applications

Reader Enquiry
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Hyperspectral-based Tree Assessment System (HTAS)

Currently, natural resources and plantation managers are facing management problems because there is no integrated system that can provide the ability to perform tree counting and stress detection automatically and accurately. It is either they have to do this manually or perform the tasks using multiple software in different systems. Thus, this motivates the development of an integrated system that contains both capabilities that will help the users to do the tasks more conveniently and efficiently. Tree counting algorithm and optimised vegetation indices have been developed in order to enhance the capability of hyperspectral remote sensing in tree detection, counting and stress detection. An integrated system which is known as Hyperspectral-based Tree Assessment System (HTAS) was developed in order to facilitate tree counting and stress detection analysis. The system utilises the capability of airborne hyperspectral imagery in providing high spatial and spectral information. The system is capable of facilitating automatic and fast processing of hyperspectral image and delivers results related to tree counting and stress mapping. This development essentially consists of two important parts, pre-processing and processing. All these processes were implemented using ENVI and Matlab software.

The algorithm for tree counting comprises six major parts: (i) discrimination of land cover using spectral analysis; (ii) texture analysis; (iii) edge enhancement; (iv) segmentation process; (v) morphological analysis; and (vi) blob analysis. The average accuracy obtained was 95%, which indicates that high spatial resolution airborne imagery data with an appropriate assessment technique have the potential to provide us with vital information for plantation management.

For stress detection, optimised spectral indices algorithms were developed based on newly defined reflectance values at wavelength locations of 734 nm (near infrared) and 616 nm (red). The selection of these two bands was based on laboratory statistical analysis using field spectroradiometer reflectance data. These two bands were then applied to airborne hyperspectral imagery analysis. The classification results from the optimised hyperspectral indices were compared to the other techniques and the optimised spectral indices obtained the highest overall accuracy of 86%.

The system manages to overcome the disadvantages of traditional methods in tree inventorying and stress mapping which are tedious, time consuming and costly. The development of an integrated system that contains both capabilities will help the users to do the tasks more conveniently and efficiently. HTAS will help natural resources and plantation management in addressing the need to know the total number of trees and location of stressed trees through the analysis of airborne hyperspectral imagery.

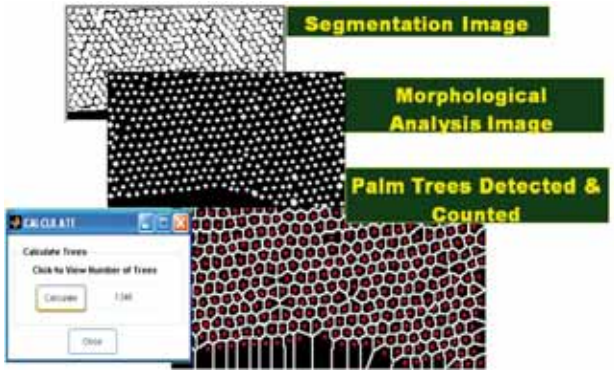

Figure 1: Index Image Derived from Optimised AISA Spectral Index, D2

Related Awards

SILVER *UPM Invention, Research & Innovation Exhibition (PRPI 2009)*

BRONZE *Malaysia Technology Expo (MTE 2010)*

GOLD *(Agriculture Category) Invention & New Product Exposition (INPEX 2010)*

Related Publications

H. Z. M. Shafri and M. R. M. Yusof, 2009.Determination of Optimal Wavelet Denoising Parameters for Red Edge Feature Extraction from Hyperspectral Data. SPIE Journal of Applied Remote Sensing. 3, 033533.

H. Z. M. Shafri, M. I. Anuar and M. I. Saripan, 2009. Modified Vegetation Indices for Ganoderma Disease Detection in Oil Palm from Field Spectroradiometer Data. SPIE Journal of Applied Remote Sensing. 3, 033556.

H. Z. M. Shafri, N.Hamdan and M. I. Saripan, 2011. Semi-automatic Detection and Counting of Oil Palm Trees from High Spatial Resolution Airborne Imagery. International Journal of Remote Sensing. 32, 8, 2095-2115.

H. Z. M. Shafri, M. I. Anuar, I. A. Seman and N. M. Noor, Spectral Discrimination of Healthy and Ganoderma-Infected Oil Palms from Hyperspectral Data. International Journal of Remote Sensing (Accepted to be published - in press).

H. Z. M. Shafri, N.Hamdan and M. I. Anuar, Detection of Stressed Oil Palms from an Airborne Sensor Using Optimized Spectral Indices. International Journal of Remote Sensing (Accepted to be published – in press).

Reader Enquiry

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Construction of Artificially Structured Biofilm Using Wire Cloth Electrodes from Textile Technology by Dielectrophoresis

Microbial consortia in nature tend to exist in highly organised macroscopic structures with extensive internal organisation, where the cells of individual species form either distinct, microscopic layers or microcolonies embedded within more diffuse aggregates of other species. This structural order is very important for the functioning of the consortia such as promoting interspecies nutrient transfer, preventing the build-up of toxic or inhibitory waste products and minimises the formation of chemical gradients and others. Due to the advantages of having a structural system in natural systems, the ability to mimic naturally occurring structures in artificial microbial consortia might offer considerable promise to intensify a wide range of industrial processes.

In this work, we showed that it was possible to make arrays of microelectrodes for electrokinetic experiments by weaving metal wires into a cloth in which the metal wires form the weft, and each metal wire was kept parallel and separated by flexible insulating polyester wires forming the warp. Here, dielectrophoresis i.e. a branch of electrokinetics science, was utilised to collect cells from the suspending medium. Dielectrophoresis (DEP) is the movement of particle or cells under the influence of non-uniform alternating current (AC). Construction of multilayered biofilm which consisted several microorganisms can be made possible by this dielectrophoretic deposition. This constructed artificially structured microbial consortia (ASMC) can then be immobilised using a suitable reagent. Although the cloth used here was relatively small, the cloth can be produced with very large surface areas, making it possible to produce biofilms by DEP over large surface areas. The cloth produced can also be folded, making it possible to create large surface areas in small volumes. Thus, the development of textiles for AC electrokinetics would make it possible to produce biofilms on a scale useable in industrial applications.

Other than making consortia of microbial cells, the technique is readily applicable to any cell type and even non-living materials, and could, for example, also be used in engineering human tissues. A variety of the weaving pattern besides a plain weave could also be used to create different electric field patterns, and hence attract cells to different places in the cloth. Finally, the cloth produced could also have applications in many other areas in which DEP and other AC electrokinetic techniques have been used to advantage in particular separations.

Figure 1: Microelectrode wire cloth produced

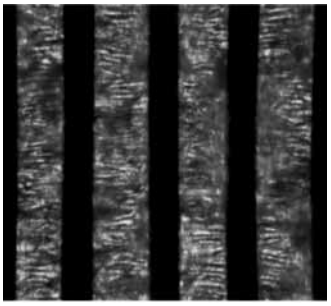

Figure 2: Consortia of yeast assembled and immobilized on top of *M.luteus*

Related Awards

SILVER *Malaysia Technology Expo (MTE 2010)*

GOLD *UPM Invention, Research & Innovation Exhibition (PRPI 2009)*

Related Publications

Z. Z. Abidin, Z. Yunus and G. H. Markx, 2009. Dielectrophoretic Separation of Cells Using 3-D Microelectrode. PERTANIKA Journal of Science and Technology. 17, 2, 13.

Z. Z. Abidin, A.G Liew Abdullah, Z. Yunus and G.H Markx, 2007. Wire Cloth Electrodes: A Study of Electric Field for Dielectrophoretic Separation of Cells. International Journal of Engineering and Technology. 4, 2, 205-212.

Z. Z. Abidin, D.R. A. Biak, N. Hafifudin and G.H. Markx, 2008. Factors Affecting Dielectrophoretic Separation of Cells Using High-gradient Electric Field Strength System. Journal of Science and Technology (JESTEC). April: 1, 30-39.

Z. Z. Abidin, L. Downes and G. H. Markx, 2007. Novel Electrode Structures for Large Scale Dielectrophoretic Separations Based on Textile Technology. Journal of Biotechnology. 130, 2, 2, 183-187.

Z. Z. Abidin, L. Downes and G. H. Markx, 2007. Large Scale Dielectrophoretic Construction of Biofilms Using Textile Technology. Biotechnol. Bioeng. 96, 1222-1225.

Reader Enquiry

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Graduate Entrepreneurship Programme Workshop

► A Graduate Entrepreneurship Programme Workshop that was conducted on the 5th and 6th October 2011 was a Business Plan Workshop for ten soon to be established companies. The objective of the workshop was to enhance business plans for the application of grants from MTDC (Malaysian Technology Development Corporation Sdn. Bhd). The evaluation panel included Prof. Dr. Mohd Azmi Mohd Lila, CEO of the UPM Innovations Sdn. Bhd. and Dr. Ahmed Razman Abdul Latif, a researcher from the Graduate School of Management (GSM) where both assisted in giving useful comments towards a winning business plan. The second Business Plan Workshop is scheduled on the coming 31th October 2011. This workshop is in accordance to the UPM-MTDC Symbiosis TM programme where 20 selected young UPM graduates were chosen to be entrepreneurs to commercialise research technologies of UPM. **Table 1** shows the list of companies formed from the programme.

NO	UPM RESEARCHER	TECHNOLOGY	ENTREPRENEUR	COMPANY
1	Assoc. Prof. Dr. Ratnasamy Muniandy Faculty of Engineering	Turamesin/Stone Mastic (Patent Granted MY 128891A)	Mohd Fareez Fahmi Mohd Rashd, Mahmudah Aunudin	NOVAPAVE Sdn. Bhd.
2	Prof. Ir. Dr. Norman Mariun Faculty of Engineering	Ohmic Heated Pasteuriser (Patent Pending 20084842)	Mohd Sobri Muhamad Hasbullah, Ahmad Marwan Mahadi	Myterra Sdn. Bhd.
3	Assoc. Prof. Dr. Faridah Qamaruzzaman Institute of Bioscience	Therapeutic Herbal Bath (Putra Aromatic) (Technology Know How)	Hazarini Daud, Suhaimi Hj. Samsudin	EtlinGEra Sdn. Bhd.
4	Prof. Dr. Suhaila Mohamed Faculty of Food Science and Technology	Cardio Mate Seasoning from Seaweed (PI 20071208) Kardi Mind Palm Tea Sachet (PI20106110)	Nordanial Rohimi	PhytoQuest Sdn. Bhd.
5	Prof. Dr. Zulkifli Shamsuddin Faculty of Agriculture	UPM B10: Biofertiliser (Technology Know How)	Muhamad Nazri Lokman, Zuyati Yahaya	Phytogold Sdn. Bhd.
6	Assoc. Prof. Dr. Abdul Rashid Mohamed Shariff Faculty of Engineering	Real Time Oil Palm Fruit Grading System (PI20107069), Fresh Fruit Bunch (FFB) Hyperspectral Scanner (PI20107086)	Mohd Hafiz Mohd. Hazir	Quallinaire Technologies Sdn. Bhd.
7	Prof. Dr. Fauziah Othman Faculty of Medicine and Health Sciences	Prevention Agent for Liver Cancer (Vitaberry Supplements) (Technology Know How)	Mohd Khairul Ainuddin Md Zin, Daelami Amin	Healviver Sdn. Bhd.
8	Prof. Dr. Maznah Ismail Institute of Bioscience	TQRF (Thymoquinone Rich Fraction as Cardioprotective and Neuroprotective Agents) (PI20084925)	Mohammad Hanif Miskandar	NUTRACREME Sdn. Bhd.
9	Prof. Dr. Maznah Ismail Institute of Bioscience	Production Of GBR (Germinated Brown Rice) As Neutraceutical and Funtional Food (PI20064528) Specialty Rice Bran Oil (RIBO) Hypercolestrolemic (PI20042722)	Mohammad Firdaus Abu Bakar, Justina Anak Narin	GermiBran Sdn. Bhd.
10	Assoc. Prof. Dr. Vijayletchumy Subramaniam Faculty of Modern Languages and Communication	Phonic Software, a Form of Tutor for Children with Visual Dyslexia (Copyright)	Nur Atiqah Anuar, Nor Azura Kamarulzaman	Braineo Solution Sdn. Bhd.

Table 1: List of companies for the UPM-MTDC Symbiosis ™ Programme

Reader Enquiry

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.....Continued from Synthesis Issue 34, September 2011

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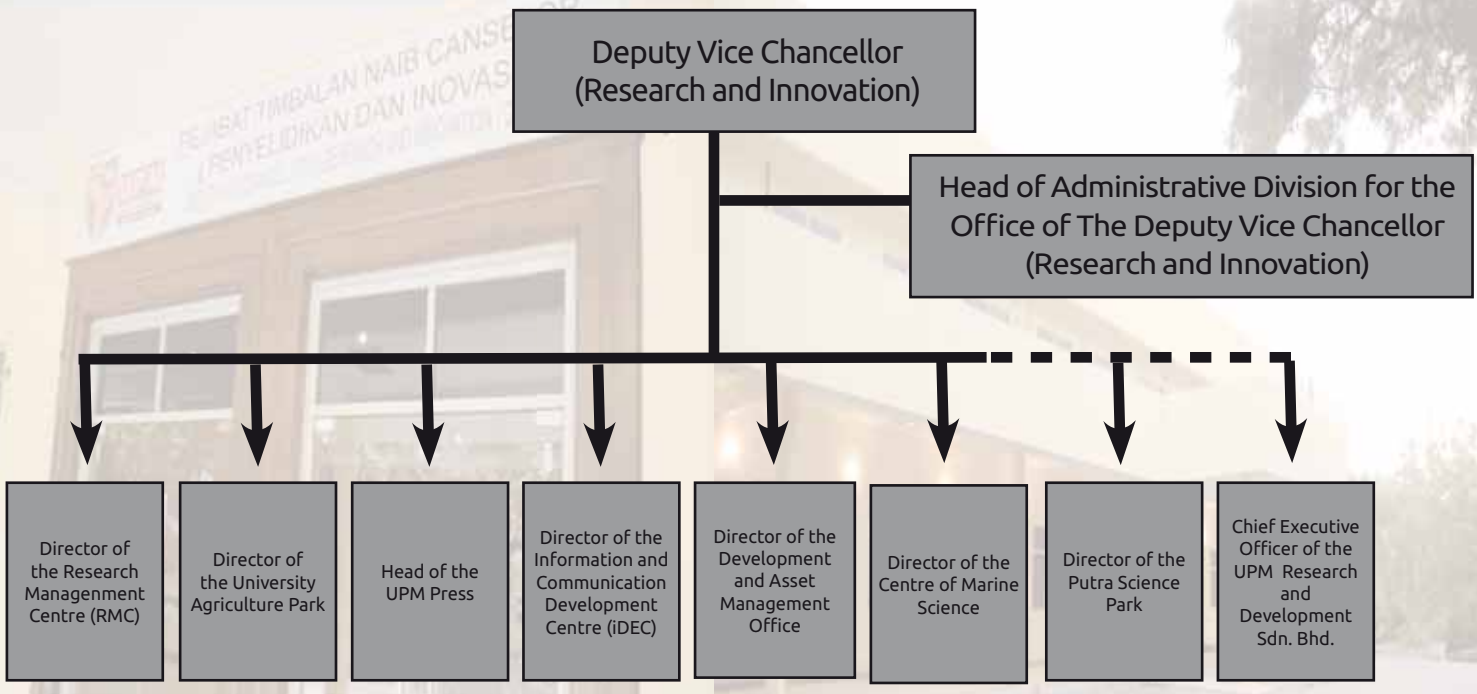

UPM Press consists of four divisions – Administrative, Financial and Marketing Division, Editorial and Production Division, Design and Creative Media Division as well as Journal Division. The Administrative, Financial and Marketing Division manages author's royalty payment, honorarium and conducts visits and exhibitions in the effort of promoting and marketing books published by UPM Press. Among the responsibilites of the Editorial and Production Division are to plan and administer the production of quality manuscripts according to the publication style of UPM Press. The Design and Creative Media Division on the other hand provides consultation services regarding the overall concept of a publication, development of ideas and technical expertise With regard to the Journal Division, one of the main roles of Pertanika Editorial office is to promote the Pertanika journal in Southeast Asia region and beyond so as to solicit good quality research papers.

The University Agriculture Park has five sections – Crop Section, Livestock Section, Farm Engineering Section, Puchong Farm Section and Teaching, Research and Professional Services Section. The Crop Section provides services related to agriculture teaching and research through the development of its area, human resources and the usage of modern machinery technology. The Livestock Section provides livestock for teaching and research as well as related services to practical students, students and staff of the university. The Farm Engineering Section on the other hand, coordinates activites related to the development of civil mechnical and electrical engineering. The Puchong Farm Section is a collection centre for various gemplasms of tropical fruits for teaching and research. The Teaching, Research and Professional Services Section coordinates professional services activities (short term courses, visits, publications, etc) as well as manages the golf course of UPM.

The Information and Communication Development Centre (iDEC) has eight main sections –Network Infrastructure which is responsible for the computer network of UPM known as UPMNet which is the backbone that supports ICT usage of the whole campus; Governance and Future Computing where this section is responsible in providing an environment where all information and businesses are conducted electronically ICT Support for Research and Academia; University Main ICT System; Digital Media; User and ICT Networking Services; and Data Management and Administration. The centre is responsible to be proactive in expecting ICT transformational impacts on teaching and learning, research, administration, collaboration and community development. The centre facilitates discussion of policy and planning for information and communication of technology at each administrative level in UPM.

.....To be continued in Synthesis Issue 36, March 2012

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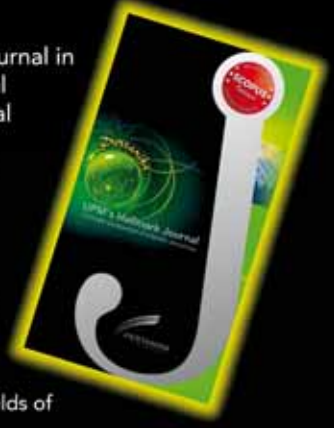
Pertanika is an international peer-reviewed leading journal in Malaysia which began publication in 1978. The journal publishes in three different areas — Journal of Tropical Agricultural Science (JTAS); Journal of Science and Technology (JST); and Journal of Social Sciences and Humanities (JSSH).



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**.

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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 title of the paper and abstract only. Page 4 and subsequent pages to have the text - Acknowledgments - References - Tables - Legends to figures – Figures, etc.

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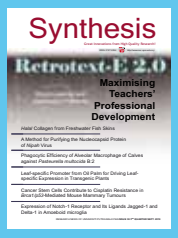

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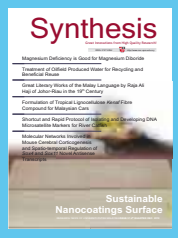

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