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Three Dimensional Nonlinear Temperature and Structural Analysis of Roller Compacted Concrete Dam

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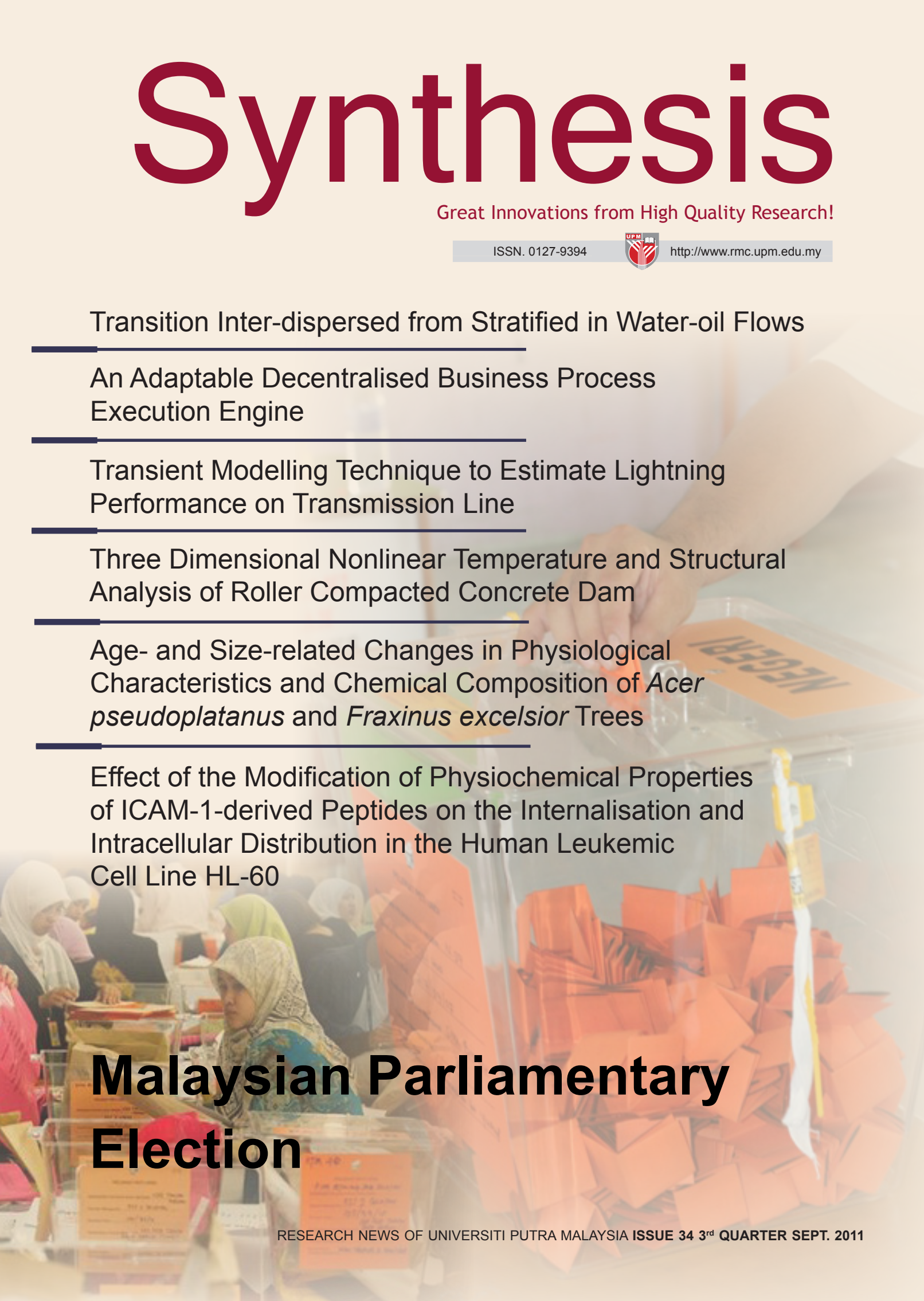

Malaysian Parliamentary Election

In this Issue

What's Next in the Coming Issue...

- Mapping Quantitative Trait Loci (QTLs) for Fatty Acid Composition in an Interspecific Cross of Oil Parm
- Enhancing Muscular Strength Qualities in Untrained Women: Linear Versus Undulating Periodisation
- Methicillin-resistant *Staphylococcus aureus* among Pigs and Pig Handles in Malaysia

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SALM Accreditation for University Agriculture Park's Vegetable Plot

A section of the vegetable plot in *Taman Pertanian Universiti* or University Agriculture Park has been accredited with a certification of SALM from the Department of Agriculture, Malaysia. SALM *(Skim Amalan Ladang Baik Malaysia)* or Malaysian Good Farm Agricultural Practice Scheme is a certification programme designed by Ministry of Agriculture and Agro-based Industry to accreditate farms that utilise good agricultural practices (GAP) with an environmental friendly concept besides producing good quality products which are safe and suitable for consumption. The voluntary scheme, focussing primarily on vegetables and fruits cultivators, was launched by the Minister of Agriculture and Agro-based Industry on 31st January 2002. University Agriculture Park took the initiative to obtain this accreditation and was duly awarded on the 15th of July 2010 with an area of 1.9 hectares under the scheme.

It is imperative for the park to expose students to good agriculture practices according to the standards set by SALM. This is because the University Agriculture Park has been given the responsibility to provide facilities and services to support teaching and research programmes in the field of agriculture. With the SALM accreditation, the University Agriculture Park thus has a farm that provides students with hands-on experience regarding good farm practices and also as a showcase of an accreditated farm.

In order to obtain this certification, certain conditions have to be fulfilled such as:

- the farm is legally operated;
- must present a soil test report;
- has suitable topography for agriculture;
- practice soil rehabilitation;
- has proper farm records;
- planted with recommended clones or varieties;
- does not use any fertiliser with industrial and animal wastes;
- use only registered pesticides;
- use integrated pest management;
- practice work safety for workers;
- has proper pesticide storage;
- use proper and suitable harvesting method;
- abide by the Workers' Act; and
- pesticide residues below the maximum residue levels (MRLs)

The Malaysian Farm Accreditation Scheme, through its certification and rights to use the SALM logo, is a programme that gives UPM the leverage and advantage in enhancing the quality of the university's agriculture product so as to enable the country's food crops to compete locally and globally.

Abdul Ghani Hashim (Hj.)
Head of Division (University Agriculture Park)

Malaysian Parliamentary Election

Expert's Snapshots

Jayum Anak Jawan is a Professor of Politics and Government at Universiti Putra Malaysia where he teaches Malaysian politics and ethnic relations in the Department of Government and Civilisation Studies, Faculty of Human Ecology. He received his B. A. (Political Economy) in October 1980 from the University of North Carolina in Asheville, USA, M. A. (Political Science: International Relations) from the Appalachian State University in Boone, North Carolina, USA in December 1981 and his Ph.D. (Southeast Asian Studies) from the University of Hull in December 1991. He joined UPM in 1982 as a lecturer of politics and was subsequently appointed as an Associate Professor in 1994 and a Professor in 2001. Jayum has also held various appointments such as a Visiting Professorial Research Fellow at the University of Hull, UK in 2004 and 2005; a Visiting Fellow of the Korea Foundation, Seoul (2007) and a Visiting Research Professor at the University of Leeds (2011). The current appointment from the Leeds is to work on an election project focussing on the 2011 Sarawak elections and the forthcoming parliamentary elections. Outside the university, he chairs, since 1997, the Expert Panel on Malaysian Studies at the Malaysian Qualifying Agency (MQA), Ministry of Higher Education and an institutional auditor for the agency. He is currently the Deputy Head for the Politics, Security and International Affairs (Cluster of the National Council of Professors).

Results of the 2008 general election caught many analysts and the people at large by surprise. It was totally unexpected that the National Front (NF) would be denied its two-third majority that the ruling coalition has been securing since the first general election held in 1964 after the formation of Malaysia in 1963. Since then, the NF was able to regain its supremacy by winning a two-third majority in the federal parliament until 2008. That therefore makes the 2008 general election the country's 11th general election held. However, in between these general elections, the ruling NF coalition merely lost one or two states, as it did in the Malay heartland of Kelantan (1990, 1995, 1999, 2004) and Terengganu (1999) as well as the former crown colony of Sabah (1984, 1985, 1990 and 1994). Therefore, when the coalition failed to secure a two-third majority in the 2008 general election and at the same time lost four additional states to a loose electoral pact of the Malay-led PKR (*Parti Keadilan Rakyat* [Peoples' Justice Party]), the Islamic based PAS (Pan Islamic Party) and the Chinese dominated DAP (Democratic Action Party), shock waves were felt by all parties across the nation.

Even the PKR-DAP-PAS's People's Alliance (PA) was surprised by the huge win because they had only expected to perform better than the 2004 general election. Instead, they got the results far exceeding their wildest expectation. First, their goal of denying NF the two-third majority was well exceeded when PA collected 82 seats. That was eight seats more than the minimum of 74. Second and perhaps more shockingly, was the fact that the above success was accompanied by winning over four states, namely Kedah, Perak, Penang and Selangor. Kelantan, as expected, was also retained by PAS. The overall result was indeed a surprise as the NF was expected to again easily sweep back into power as it did for the previous general elections. A comfortable two-third majority was also expected this time around because it had done extremely well in the 2004 general elections. So, what actually happened on 8 March 2008? Why does the long running NF perform rather badly in comparison to their previous electoral performances? What could explain for the sudden surge of popular electoral support for the loose and unlikely partners of PKR, DAP and PAS? The opposition went to the election by arguing that their main goal was to try to deny the NF the two-third majority so that the latter's leadership would be more accountable, responsible and transparence. This time, the opposition succeeded.

Naturally there are always two sides of a story. On the one hand, there were those who argued that the opposition won because they were beginning to get support from the people. Thus, the theory went on to say that they (the opposition) were beginning to gain ground and mass support. On the other hand, there were those who said that the opposition was gaining substantial support from the people not because they (the opposition) were strong, but because NF and its components were weak. According to this theory, the support for the opposition was therefore to show the people's rejection of the NF and its components. The rejection was therefore said to be temporary because it was meant to "teach" lessons to the NF components and their candidates who, their supporters had argued, had become arrogant and abusive in every way imaginable. At the same time, there was also a sizeable new young voters who, many analysts argued, had anti establishment attitude and therefore tended to lean toward the opposition, either towards DAP among the Chinese youth and PKR among the Malay youth. Be it temporary or not, what do the results of the 2008 general election really mean? Undoubtedly, the results signalled the need for a change. Change of what or change in what? Is the call for change as reflected in the results of the 2008 parliamentary general election sustainable?

There are a number of observations from the results of the 2008 general election that have some implications in shaping the future of the political processes in the country. Firstly, the wind of change is indeed devastating. Due to the disastrous performance of the NF and some of its components, political careers for some of their leading leaders were destroyed. Secondly, the 2008 election results showed that UMNO is losing the support among the Malays. This has never

happened before. Even in 1969, the party still commanded a simple majority of support among the Malays in the Peninsula. The wind of change caused the NF and UMNO to lose four states, two of which are the industrialising states in the country – Penang and Selangor. However, the lost of Penang, a Chinese majority state, could not really be blamed on UMNO. The lost was because the Chinese MCA and Chinese-led Gerakan were badly defeated by DAP. Gerakan lost all 13 state seats it contested, while MCA lost 9 out of 10 seats. Chinese seats given to MIC by both parties were lost to the opposition as well. Thirdly, the main setback for NF and UMNO has to be the lost of Kedah, Perak and Selangor. The lost of Kelantan is not really an issue and neither is Kedah as far as politics and polity of the Malays are concerned. Nothing much out of the unusual has developed in these two states as a result of losing them to the opposition. Fourthly, the main concern and potential friction sources will not only come from the competition for power among the different groups of Malays under different political parties, namely UMNO versus PKR and PAS, but it will also come from the promotion and defense of inter-ethnic interests by different communities.

Fifthly, ethnic consideration is seen as an important factor in determining which party is to contest in which constituency. The ethnic pattern is easily detectable even by a novice. Regardless of what each electoral pact attempts to preach, both NF and PA fell into the ethnic trap because that is the reality of politics and political processes in this plural country of ours. Hence, the ethnic perspective of looking and understanding issues and challenges will continue to influence and color the political discourses in the country. This assertion, however, is in contrast to many opinions that have expressed confidence in the lesser important that the ethnic factor would play in Malaysian politics in the times to come as a result of changing patterns and attitudes of various ethnic communities during the 2008 general election. However, the recent convening of the "Congress on Malay Solidarity" by Malay NGOs pointed to the continuing relevant of the ethnic factor. The perception of the Malay sovereignty erosion in a Malay polity may be generated by several developments that have emerged from a weak Malay leadership with regard to the formation of state governments where the opposition won over Selangor and Perak particularly. Lastly, there is a fundamental difference between the results of the 1969 and 2008 general elections for the NF and UMNO especially. In 1969, the Alliance won a simple majority based on the number of seats in the peninsular part of Malaysia, but depended on Sabah and Sarawak to deliver the two-third. In 2008, the NF and UMNO lost the majority of seats in the peninsula and depended on Sabah and Sarawak to deliver the majority required to form the federal government.

It will take some time for all parties to absorb and internalise the political reality facing the country after the 2008 election. The difficult lost suffered by the NF and its components threw the long reigning coalition into a temporary disorientation, either in purpose or vision and mission. The act of finger pointing and the state of denial preoccupied many, including some key leaders of various component parties who were defeated. Thus, no wonder why there were so many conflicting statements as members and leaders of the various components felt the need to justify their respective parties' performances of the 2008 general election. Besides that, the leaders of PA and its component parties are still in euphoria and at the same time in a daze as well. Will having a larger opposition in parliament and having several states run by different parties enhance democracy in the country? That is if one believes that monopoly is essentially evil. Democracy however is neither served because there are many different groups ruling different parts of the country nor because there are almost equal number of parliamentarians from different political persuasions. People will obtain the benefits because their representatives work for them and not for themselves. In light of the many changes that are taking place after the election, it is opportune to re-examine roles of assemblymen who serve in many capacities such as being a parliamentarian, a state assemblyman and a member of the executive council and at the same time continue to run their private businesses and practices. As the MPs from the opposition are being criticised for holding multiple roles, now it falls upon the members of PA to re-examine themselves as many who are also taking multiple roles are justifying them as NF members do before them.

In short, the 2008 general election definitely leaves everyone guessing for the outcomes of the coming election.

Picture on the cover:
Right - Courtesy of Department of Information, Sarawak, 2011
Left - "Malaysia Denies Indonesia's Polling Booth Request". Retrieved August 2, 2011 from http://article.wn.com/view/2009/03/06/Malaysia_denies_Indonesias_polling_booth_request/

Picture on the fourth page:
Courtesy of Department of Information, Sarawak, 2011

Picture on the fifth page:
"General Election Preparation Top Agenda of BN Meeting on Friday" Perak Today: The Portal. Retrieved August 2, 2011 from http://peraktoday.com/wp/?p=20779

Related Publications

The 2008 General Elections: Bottom Line – paper presented at the UPM Panel on "The 2008 General Elections: Implication for the Process of Nation Building" for the 9th Biennial Conference of the Borneo Research Council, jointly organised by Borneo Research Council (Virgina, US) and Universiti Malaysia Sabah, Kota Kinabalu.

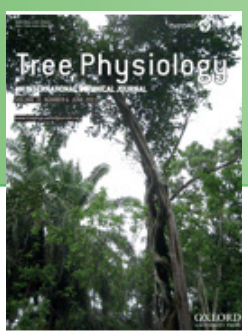
Ethnic Relations in Malaysia: The Aftermath of the 2008 General Election – paper presented at the Religious and Cultural Pluralism Panel for the International Conference of the ARC-Asia Pacific Future Research Network and the Adelaide Asian Studies Group, jointly organised by Flinders University, Adelaide University and the University of South Australia, Adelaide.

The General Election of 2008: Implications for Inter-ethnic Relations – paper presented at the World Civic Forum 2009: Building our Humanitarian Planet, jointly organised by Kyung Hee University, Seoul & UN Department of Economic and Social Affairs, Seoul Convention Centre, Seoul, South Korea.

Reader Enquiry

Jayum A. Jawan

Department of Government & Civilisation Studies, Faculty of Human Ecology, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.
Tel: +603-8946 7076 E-mail: jayum@putra.upm.edu.my



Age- and Size-related Changes in Physiological Characteristics and Chemical Composition of *Acer pseudoplatanus* and *Fraxinus excelsior* Trees

Title : Age- and Size-related Changes in Physiological and Characteristics and Chemical Composition of *Acer pseudoplatanus* and *Fraxinus excelsior* Trees

Author(s) : **Hazandy Abdul-Hamid** and M. Mencuccini

Journal : Tree Physiology 29, pp. 27-38

Impact Factor : **2.29**

Generally, the growth of all forests accelerates as canopies develop in young forests and declines substantially soon after maximum leaf area is attained. The causes of this decline trend are multiple. Initially, age- and size-related decline is attributed to photosynthesis-respiration imbalance. However, age and size factors are normally coupled during growth. As trees age and increase in size, the resistance along with the water transport path has been hypothesised to increase and potentially limit the ultimate size that a tree can reach. Although a substantial body of evidence suggests that large and old trees have reduced metabolic levels, the search for the causes behind this observation has proved elusive.

Although photosynthesis is responsible for tree growth, the links between these two processes are still not well understood. It is true that when photosynthesis is greatly impaired, growth declines. However, there appears to be a wide range of photosynthetic rates observed for any given level of growth. In fact, there may be situations where growth appears to control photosynthesis. This dynamic relationship between photosynthesis and growth is very relevant for studies of the so-called age-related decline in forest productivity.

An experimental manipulation was adopted to separate the effects of size from those of age by using traditional grafting techniques. Grafting techniques help to disentangle these alternative hypotheses, because they allow separating the effects of size from those of age, by obtaining vegetatively propagated plants that are of similar size, while their aboveground tissues maintain the putative ages of the apical meristems of the original donor trees. Genetically identical grafted seedlings were produced from scions taken from trees of four different age classes of two species, ranging from 4 to 162 years of age. The strong coupling between age and size, commonly encountered in the field, precluded the isolation of the potential causes.

The results showed that leaf-level net photosynthesis per unit of leaf mass and some other leaf structural and biochemical characters decreased substantially with increasing size of the donor trees in the field, although other gas exchange parameters on a leaf area basis did not. In contrast, these parameters remained almost constant on grafted seedlings, i.e., scions taken from donor trees with different meristematic ages did not show any age-related trend after they were grafted onto young rootstocks. These results suggested that size-related limitations may have triggered the decline in the production of photosynthates and the reduced growth of the trees, whereas little evidence was found to support a role of meristematic age *per se*. Generally, the gas exchange results only partially supported the observed size-related changes in growth parameters, whereas they were clear in disproving age-related changes, in agreement with several recent papers. In the field, clearly declining trends were observed for mass-based A_{net}, SLA and $\delta^{13}C$ for both species. Overall, our results showed that the changes in A_{net} and leaf characters are primarily triggered by size, not age.

Figure 1: Graft union of *A. pseudoplatanus* (A) and *F. excelsior* (B), 30 months after grafting

Related Publications

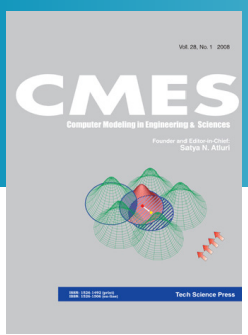
M. Mencuccini, J. Martínez-Vilalta, D. Vanderklein, **H. A. Hamid**, E. Korakaki, S. Lee and B. Michiels, 2005. Size-mediated Ageing Reduces Vigour in Tall Trees. Ecology Letters, 8, 1183–1190.

M. Mencuccini, J. Martinez-Vilalta, **H. A. Hamid**, E. Korakaki and D. Venderklein, 2007. Evidence for Age- and Size-mediated Controls of Tree Growth from Grafting Studies. Tree Physiology, 27, 463–473.

Reader Enquiry

Hazandy Abdul Hamid

Institute of Tropical Forestry and Forest Products (INTROP), Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.
Tel: +603-8947 1783 E-mail: hazandy@gmail.com



Three Dimensional Nonlinear Temperature and Structural Analysis of Roller Compacted Concrete Dam

Title : Three Dimensional Nonlinear Temperature and Structural Analysis of Roller Compacted Concrete Dam

Author(s) : **Jamaloddin Noorzaei**, A. A. Abdulrazeg, M. S. Jaafar, T. A. Mohamed and K. H. Bayagoob

Journal : CMES-Computer Modelling in Engineering & Sciencesy 47 (1), pp. 43-60

Impact Factor : **4.78**

Many models on roller compacted concrete (RCC) dams have been proposed since 1960 to predict realistic short and long term evaluations of the risk of the thermally induced cracking. The proposed models range from low level of approximate methods to highly accurate level ones using two and three dimensional sophisticated finite element analyses. The control of thermal cracking in roller compacted concrete dams is of great importance to ensure the safety of the dams and a desired lifetime service. Elastic plastic analysis is required to make reliable prediction of stresses fields which may lead to cracking risk. The nonlinear phenomena in structural response of RCC dams have not been addressed extensively, partly because of the complexity of the problem and the extensive computational effort required for carrying out the coupled thermal and structural time increment analysis.

This investigation focussed on the development, verification and application of a three-dimensional finite element code for coupled thermal and structural analysis of roller compacted concrete dams. The Kinta RCC gravity dam, which is the first roller compacted concrete dam in Malaysia, was selected to verify the finite element code. The actual climatic conditions and thermal properties of the materials were considered in the analysis. Twenty-node isoparametric elements were used in the analysis. The mesh of the dam body was generated in such a way to simulate the construction phase. The developed code was verified by comparing the predicted temperatures with actual temperatures recorded by thermocouples installed in the body of the dam. The thermocouple locations which were installed at some selected levels in the deepest block of the dam are shown in **Figure 1**. The comparison between the three dimensional finite element predicted temperatures and the temperatures recorded by thermocouples installed at different elevations. It is clear from these plots that the predicted temperatures obtained from the developed code (3D analysis) are in agreement with the recorded temperatures. The proposed system can be used to predict the safety of gravity dams during construction and operation phases.

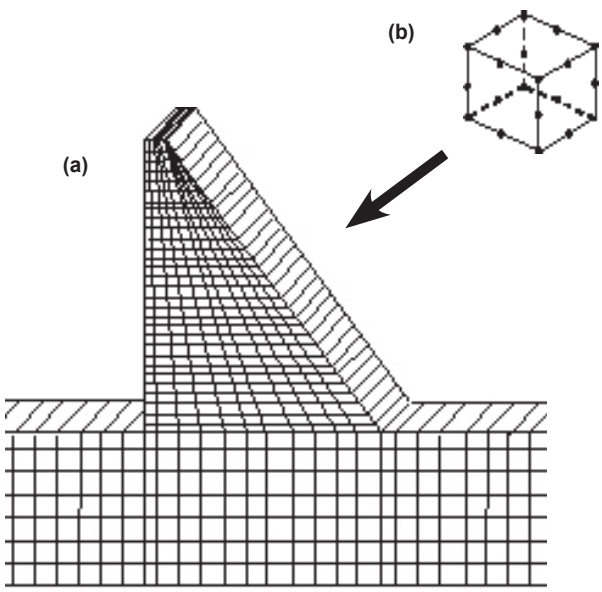


Figure 1: Three- dimensional Finite Element Model- Mesh
(a) Dam foundation system
(b) Twenty node isoparametric element

Related Publications

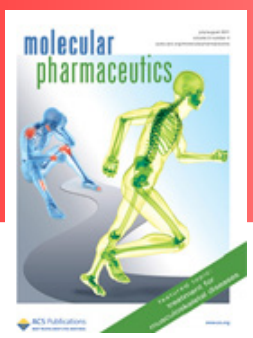
J. Noorzaei, K. H. Bayagoob, W. A. Thanoon and M. S. Jaafar, 2006. Thermal and Stress Analysis of Kinta RCC Dam. Journal Engineering Structures, 28, 1795–1802.

M. S. Jaafar, K. H. Bayagoob, **J. Noorzaei** and W. A. Thanoon, 2007. Development of Finite Element Computer Code for Thermal Analysis of Roller Compacted Concrete Dams. Journal of Advances in Engineering Software, 38, 886–895.

Reader Enquiry

Jamalodin Noorzaei

Department of Civil Engineering, Faculty of Engineering,
Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.
Tel: +603-8946 6371; 017-632 6573 E-mail: jamal@eng.upm.edu.my



Effect of the Modification of Physiochemical Properties of ICAM-1-derived Peptides on the Internalisation and Intracellular Distribution in the Human Leukemic Cell Line HL-60

Title : Effect of Modification of the Physiochemical Properties of ICAM-1-derived Peptides on the Internalisation and Intracellular Distribution in the Human Leukemic Cell Line HL-60

Author(s) : S. Majumdar, **Bimo Ario Tejo**, A. Badawi, D. Moore, J. P. Krise and T. J. Siahaan

Journal : Molecular Pharmaceutics 6 (2), pp. 396-406

Impact Factor : **4.56**

The present work is designed to test the hypothesis that increasing the hydrophilicity of the conjugates may modify the entry mechanisms of DOX-cIBR-derivatives into HL-60 cells from passive diffusion to receptor-mediated uptake. Two approaches were used to change the physicochemical properties of the conjugate. The first was to alter the hydrophobicity of the peptide by eliminating the hydrophobic residue at the C-terminus of cIBR. In this case, we modified cIBR peptide to cIBR7 peptide (cyclo(1,8)CPRGGSVC) by eliminating four hydrophobic residues at the C-terminus of cIBR and replacing the Pen1 residue with a Cys residue. The second method was to incorporate an 11-amino-3,6,9-trioxaundecanate linker between DOX and cIBR7 peptide s to further increase the hydrophilicity of the conjugate and generate DOX-PEGcIBR7. Fluorescein isothiocyanate (FITC) was also conjugated to cIBR7 peptide to enable FITC-cIBR7 check for endocytic uptake as was observed for FITC-labelled cIBR (FITC-cIBR).

DOX-cIBR7 conjugate was, indeed, more hydrophilic than DOX-cIBR. Addition of a more hydrophilic linker in DOX-PEGcIBR7 produced a conjugate that was more hydrophilic than DOX-cIBR7. Unfortunately, both DOX-cIBR7 and DOX-PEGcIBR7 conjugates entered the HL-60 cells by an energy-independent pathway. Reduction of the temperature from 37°C to 4°C failed to inhibit the entry of the conjugates inside the cells. In addition, the distribution profile of the conjugates inside the cell cytosol was indicative of the non-endocytic uptake pathway. The conjugates did not show localisation into distinct endocytic compartments. These results indicated that the change in hydrophobicity of the DOX-peptide conjugates does not influence their internalisation behavior.

The hypothesis that the internalisation behaviour of the DOX-peptide conjugates is due to the properties of the DOX molecule or the final conjugate was demonstrated by the energy-dependent uptake of FITC-cIBR7 peptide. If it was due to the properties of cIBR7 peptide, FITC-cIBR7 would also show energy-independent internalisation properties. However, the FITC-cIBR7 showed a temperature-dependent endocytic entry into the HL-60 cells similar to that of the FITC-cIBR. Similarly, FITC-labelled transferrin protein showed energy-dependent uptake into L929 cells, whereas the DOX-conjugate of transferrin protein (TRF-DOX) showed energy-independent cellular entry into the same cells. In addition, the uptake of the TRF-DOX conjugate could not be blocked by excess TRF.

In conclusion, we have shown that the internalisation of DOX-peptide conjugates is not influenced by the physicochemical properties of the conjugate. Irrespective of the size or hydrophobicity of the conjugates, they retain the energy-independent cellular entry. Unlike DOX-cIBR7 conjugates, the FITC-cIBR7 peptides showed energy-dependent cellular entry into the cells, suggesting that these two conjugates have different internalisation mechanisms. The FITC-labelled peptides showed different intracellular distribution compared to dextran molecules inside the cells. Although DOX is a highly effective anticancer agent, this molecule presents a unique challenge for targeted drug delivery.

Related Publications

H. Y. Makagiansar, T. Yakovleva, **B. A. Tejo**, K. O. Hamilton, Y. Hu, G. M. Verkhivker, K. L. Audus and T. J. Siahaan, 2007. Sequence Recognition of α-LFA-1-derived Peptides by ICAM-1 Cell Receptors: Inhibitors of T-cell Adhesion. Chemical Biology & Drug Design, 70, 237–246.

Iskandarsyah, **B. A. Tejo**, U. S. Tambunan, G. Verkhivker and T. J. Siahaan, 2008. Structural Modifications of ICAM-1 Cyclic Peptides to Improve the Activity to Inhibit Heterotypic Adhesion of T Cells. Chemical Biology & Drug Design, 72, 27–33.

B. A. Tejo and T. J. Siahaan, 2009. Solution Structure of a Novel T-cell Adhesion Inhibitor Derived from the Fragment of ICAM-1 Receptor: Cyclo(1,8)-Cys-Pro-Arg-Gly-Gly-Ser-Val-Cys. Biopolymers, 91, 8, 633–641.

Reader Enquiry

Bimo A Tejo

Department of Chemistry, Faculty of Science,
Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.
Tel: +603-8946 7488 E-mail: bimotejo@science.upm.edu.my

An Adaptable Decentralised Business Process Execution Engine

In the Service Oriented Architecture (SOA), Business Process Execution Language (BPEL) specified business processes are executed by non-scalable centralised orchestration engines. In order to address the scalability issue, decentralised orchestration engines are applied which decentralise BPEL processes into static fragments at design time without considering runtime requirement. The fragments are then encapsulated into runtime components known as the agents. The decentralisation of business processes is shown in **Figure 1**.

There are a variety of attitudes towards workflow decentralisation, however, only a few of them produced adaptable fragments with runtime environment. A straightforward and compile-time Fully Process Decentralisation (FPD) method decomposes a workflow into its building activities and then encapsulates each activity in its dedicated runtime component. Consequently, the results in producing a lot of runtime components in which their interactions and resource usage degrade a runtime environment. Alternatively, Semi Process Decentralisation (SPD) method fragments a business process based on various static, compile-time and designer-based criteria and subsequently, the fragments are encapsulated in their own runtime components.

In our opinion, SOA suffers from a lack of runtime adaptability for workflow decentralisation in orchestration layer, and not to have runtime adaptable dynamic criteria to process decentralisation is the main drawback of FPD and SPD. In this work, we introduced an Intelligent Process Distribution (IPD) architecture to firstly, increase business process adaptability in a runtime environment, secondly, choose the best granularity for segments as well as encapsulate them in agents, and thirdly, enhance response time, throughput and bandwidth usage of dynamically decentralised workflows in comparison to FPD and Centralised methods. The activities involved in IPD are:

Phase 0 (Initialisation) – users define their requirements through Service Level Agreements (SLAs) which include the minimum frequency or minimum support for all activities and the level of granularity for each frequent path;

Phase 1 (Pre-processing) – removes all noise data from the log files;

Phase 2 (Tree Construction) – (i) constructs the process tree from a BPEL file (ii) marks the executed activities according to the log file information;

Phase 3 (Frequency Calculation) – includes the calculation of frequency for all activities;

Phase 4 (Frequent Path Detection and Agent Construction) – this phase depends on the required granularity, G and minimum support, which stem from the SLAs; and

Phase 5 (Wiring Frequent and Infrequent Agents) – all agents including Frequent and Infrequent ones are being wired so that they can communicate through a middleware.

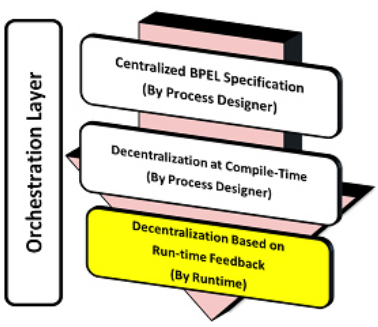


Figure 1: Runtime-based Decentralisation

Related Awards

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

BRONZE *Malaysian Technology Expo (MTE 2010)*

Related Publications

F. S. Esfahani, **M. A. A. Murad**, M. N. Sulaiman and N. I. Udzir, 2009. A Case Study of the Intelligent Process Decentralisation Method. World Congress on Engineering and Computer Science (WCECS 2009). San Francisco, USA, 269-274.

F. S. Esfahani, **M. A. A. Murad**, M. N. Sulaiman and N. I. Udzir, 2009. A Frequent Path Mining Algorithm to Intelligent Business Process Decomposition. WORLDCOMP/SWWS'09 - The 2009 International Conference on Semantic Web and Web Services. Las Vegas, Nevada, USA, 197-203.

F. S. Esfahani, **M. A. A. Murad**, M. N. Sulaiman and N. I. Udzir, 2009. Using Process Mining to Business Distribution Approach. In Proceedings of the ACM Symposium on Applied Computing (SAC 2009). Hawaii, USA, 1873-1878.

Reader Enquiry

Masrah Azrifah Azmi Murad

Department of Information Systems, Faculty of Computer Science & Information Technology, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.
Tel: +603-8947 1739 E-mail: masrah.azrifah@gmail.com

UPM Invention, Research & Innovation Exhibition in Reminiscences

Exhibition Booths

Mini PRPI





Presentations by Researchers

Winners with their Medals



Transient Modelling Technique to Estimate Lightning Performance on Transmission Line

Lightning can cause a major impact to the overhead lines. When lightning strikes a transmission line, a large amount of current will be injected to the line. This will cause the current to flow to the earth via the tower steelwork which leads to a voltage difference between the tower cross-arms and phase conductors. Therefore, transient modelling technique is used in modelling a transmission line for assessing the lightning performance on the transmission line. This is done by predicting the critical backflashover current, probability of the transformer damage and backflashover rate (BFR) which are measured at the substation entrance. This technique is applied by using the electromagnetic transient software PSCAD/EMTDC for modelling the equivalent circuit of transmission and distribution systems such as the overhead lines, towers, footing resistances and insulators. Real data utility obtained is used as the input and comparison purpose with the simulation results. Accurate modelling and reliable results obtained can later be used in evaluating the need for proper protection scheme of the line and thus increase the quality of the electricity supplied.

For economical insulation coordination in line and substation equipment, it is necessary to predict accurately the lightning surge overvoltages that occur in an electric power system. These overvoltages will provide the data required for any mitigation method such as the employment of surge arrester. Then, the basic insulation level (BIL) of the substation equipment can be coordinated with the probability of voltage exceeds BIL. Therefore, the probability of voltage exceeds BIL computed in this research can be used as a form of reference in selecting the right mitigation method and minimum insulation requirement to reduce the probability of transformer damage at the substation. Therefore, this electromagnetic transient modelling approach clearly provides another perspective in modelling and analyses the effect of lightning on overhead lines. The surge protective device (SPD) which is developed as a solution to protect the equipment from the lightning transient offers excellent solution for a safe and reliable surge suppression system. This device has been designed and tested according to the IEEE's recommended standard on new technology of SPD clamping components and IEC requirements.

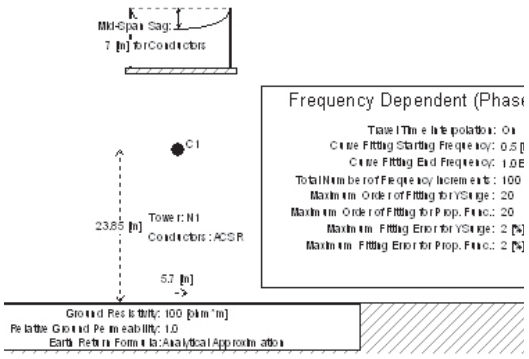


Figure 1: Example of the line model using transient modelling technique in PSCAD

Related Awards

SILVER *INNOVA/EUREKA Brussels 2009*

BRONZE *Malaysia Technology Expo (MTE 2009)*

Related Publications

M. Z. A. Ab. Kadir and M. Izadi, 2010. New Algorithm for Evaluation of Electric Fields Due to Indirect Lightning Strike. Computer Modelling in Engineering Science (CMES), 67, 1, 1-12.

M. Z. A. Ab. Kadir and I. Cotton, 2010. Application of the Insulator Coordination Gap Models and Effect of Line Design to Backflashover Studies. International Journal of Electrical Power and Energy System, 32, 5, 443-449.

M. Z. A. Ab. Kadir, Z. Mohd. Nawi and J. Sardi, 2010. Numerical Modelling and Simulation in Electromagnetic Transient Programme for Estimating Line Backflashover Performance. IAENG-Engineering Letters, 18, 4, 351-356.

M. Z. A. Ab. Kadir, M. H. Mohamed Ariff and A. M. Azmi, 2008. Modelling 132 kV Substation for Surge Arrester Studies. International Journal of Emerging Electric Power Systems, 9, 5, 6, 1-16.

M. Z. A. Ab. Kadir, M. H. Mohamed Ariff and J. Sardi, 2008. Application of Substation Transient Modelling Technique for Surge Arrester Studies. International Review on Modelling and Simulations (IREMOS), 1, 2, 349-354.

Research Grant: Science Fund (MOSTI)
Project Title: A Randomised Leader Progression Model for Backflashover Studies and Evaluation of Lightning Performance on Transmission and Substation
Amount: RM 234,000

Reader Enquiry
Mohd. Zainal Abidin Ab. Kadir
Department of Electrical and Electronics Engineering, Faculty of Engineering, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.
Tel: +603-8946 4362 E-mail: mzainal@eng.upm.edu.my

Transition Inter-dispersed from Stratified in Water-oil Flows

In the liquid-liquid flow system, it is important to understand the nature of interactions between phases and to observe the ways in which the phases are distributed over the cross section of a pipe, known as a flow pattern. In design, it is necessary to predict the flow pattern which usually will depend not only on the flow behavior but also on the superficial velocities of the phases and distribution of the fraction occupied by each phase over the cross section of the pipe. The mean in-situ volume fraction will not normally be the same as the input volume fraction. The flow behaviour is influenced by the density and viscosity of the phases and the diameter of the pipe. Most previous studies have concentrated on general flow patterns and their delineation through flow pattern maps. These studies demonstrated the tendency for the dispersed phase to be separated at the top or bottom of the channel depending on its density relative to the continuous phase. In short, the higher the velocity, the more fluids are well mixed indicating the increasing dominance of turbulence over gravity.

The phase distribution of water-oil flows was examined experimentally from a separated flow without a mixer of oil in water or water in oil dispersed in horizontal tubes. Under most conditions, the pattern was oil continuous in water dispersed or water continuous in oil dispersed flow continuously and there was an entrainment in the form of drops of phase into the other. The examinations were carried out through cross-sectional phase distribution in the flow of mixtures of water and kerosene such as EXXSOL D80. The flow developed naturally from an initial stratified flow in which oil and water were introduced separately at the top and bottom of the test section respectively. It was found that the liquids were fully inter-dispersed by the end of the test section. The results were also used to define the flow patterns in water-oil liquid-liquid flow system. The phase fraction distribution was shown to be homogeneously mixed near to the outlet of the test section. The results presented mainly to illustrate the complexity of the processes in liquid-liquid flows. The flow pattern, as a characteristic type of phase distribution, will be seen to depend not only on phase flows but also on an axial position. The pressure gradient passed through a maximum distance before becoming relatively independent of distance towards the end of the pipe. This may reflect energy losses associated with intense mixing near the inlet. At high enough mixture velocities, the phases ultimately became mixed (dispersion of water in oil or oil in water), but this was achieved only slowly as illustrated in **Figure 1**. The effect of axial (using gamma tomography) position showed the tendency of the phase to mix and approach uniform distribution as the flow proceeds along the channel in which the results are depicted in **Figure 2**. In general, the tomography results illustrated the great complexity of liquid-liquid dispersed flows, reflecting the many competing processes such as turbulence, gravitational separation, droplet break-up and coalescence, which are occurring in the channel.

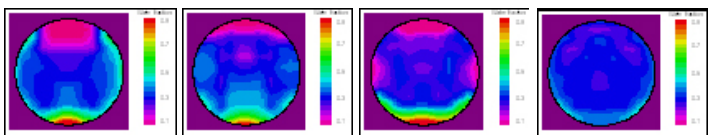


Figure 1: Cross-sectional phase distributions at a distance of 7.72 m from the inlet as a function of velocity. Input water fraction 40%

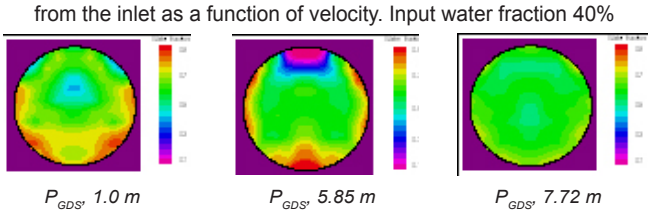


Figure 2: Effect of axial position on cross sectional phase distribution for a mixture velocity of 2.76m/s and an input water fraction of 60%

Related Awards

GOLD *British Invention Show (BIS 2009)*

BRONZE *UPM Invention, Research & Innovation Exhibition (PRPI 2007)*

BRONZE *Malaysia Technology Expo (MTE 2009)*

Related Publications

S. A. Hussain, S. M. M. Kamal and W. H. M. Jamil, 2006. In-situ Phase Fractions for Oil and Water Occupied in Pipe Channel. International Journal of Engineering and Technology, 3, 2, 248-256.

S. A. Hussain, S. M. M. Kamal, W. H. M. Jamil, X. X. Yun and G. F. Hewitt, 2007. Simulation on Oil-Water Horizontal Flows: MUSIG Model. International Journal of Engineering and Technology, 4, 1, 1-7.

S. A. Hussain, W. H. M. Jamil and S. M. M. Kamal, 2008. Influence of Oil and Water Holdup on Mixture Velocity in Horizontal Flows. Journal of Chemical Engineering of Japan, 41, 9, 837-844.

R. G. Welvekar, S. Y. Choong, **S. A. Hussain**, M. Khalid and T. G. Chuah, 2009. Numerical Study of Dispersed Oil-Water Turbulent Flow in Horizontal Tube. Journal of Petroleum Science and Engineering, Doi:10.1016j.petrol.2008.12.019.

Reader Enquiry

Siti Aslina Hussain

Department of Chemical and Environmental Engineering, Faculty of Engineering, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.
Tel: +603-8946 6292 E-mail: aslina@eng.upm.edu.my

UPM SHOWCASES 570 EXHIBITS AT THE INVENTION, RESEARCH AND INNOVATION EXHIBITION (PRPI 2011)

The Office of the Deputy Vice Chancellor (Research and Innovation), Universiti Putra Malaysia (UPM) showcased a total of 570 exhibits from the fields of agriculture, food, forestry and environment, health, science, technology and engineering as well as social sciences at the Invention, Research and Innovation Exhibition (PRPI 2011) held from the 19th to 21st of July 2011.

PRPI, as the largest research exhibition of UPM was held at the Sultan Salahuddin Abdul Aziz Shah Cultural and Arts Centre where new innovations and inventions by UPM's researchers that were ready to be commercialised to the industries were displayed. Entering its ninth year, this year's PRPI with its theme – Commercialising Innovations towards a Sustainable Economy and Community Well-being saw an invention competition among secondary schools from across the country (Mini PRPI) in addition to an exhibition on robotics, agriculture and livestock, orchids, herbs and foods for good health, cancer and health, green technology, education and social sciences as well as the UPM Creative and Innovative Circle.

The exhibition featured also a special section which highlighted UPM's research, development and commercialisation (R, D & C) on agricultural products, vaccine and nutraceutical products, cancer and health-related products as well as green technology. All the products exhibited in this section not only won various national and international awards but have also been either successfully commercialised or are in their pre-commercialisation stage. The exhibition programme included the campus tour, where visitors, school students, members of the various industries and the media were given the opportunity to ride on a tram to the UPM Equine Centre to experience firsthand on ways of handling horses, to the Putra Dairy Park to witness hi-tech cow milking and watch deer, cow and goat farming technologies, to the Conservatory Park of the Institute of Bioscienc to view the different types of herbs grown there, to the animal clinic where veterinarians shared a tip or two on proper animal care and to the orchid farm.

Prof. Ir. Dr. Saleh Jaafar, Deputy Vice Chancellor (Research and Innovation), giving his opening ceremony speech.

The PRPI 2011 saw participation of UPM's lecturers, research fellows, post-doctoral students, graduate students and research officers who entered their respective research projects into the invention competitions held at the exhibition. The exhibition is seen as a means to strengthen the strategic relationship between UPM and the ministry in line with the government's efforts to spur high-income economy through the strengthening of research, development and innovation in relevant fields and to convince stakeholders or industry players to contribute towards research funds and commercialisation efforts.

UPM INVENTS PHONICS TUTOR SOFTWARE FOR CHILDREN WITH VISUAL DYSLEXIA

Three researchers of Universiti Putra Malaysia (UPM) have produced a new software in the form of a compact disc namely Phonics Tutor Software for visual dyslexic children. Head of the research, Assoc. Prof. Dr. Vijayaletchumy Subramaniam from the Faculty of Modern Languages and Communication, UPM said that the discovery of this technology assists visual dyslexic children to master the basic literacy skills of reading, writing and counting (3M). The software applies six spelling methods based on Orton-Gillingham Phonogram in which it enables teachers to elicit children's abilities in different aspects.

"The product, estimated to be priced at RM250 in the market soon, emphasises the aspect of reading in the Malay language in accordance to the Levinson's Theory in which the product is suitable for dyslexic children aged from four to nine years old. "The product is suitable for Malaysia's learning environment whereby the Malay Language is used as the medium of instruction compared to other dyslexia products that use the English language," she added during the Putra Cipta UPM press conference organised by the Research Management Centre (RMC) and Office of Marketing and Communications (MarComm). The product is designed especially to help dyslexic children in learning the Malay language. "The software can be employed by the Ministry of Education, Department of Special Education, Curriculum Development Centre, special education teachers and parents to overcome learning difficulty of dyslexic kindergarden and preschool students," she said.Dr. Vijayaletchumy said the research of three years has been filed for patent and is funded by UPM's research grants. She is assisted by two other researchers – Assoc. Prof. Dr. Noor Aina Dani, a lecturer from the Department of Malay Language and Ms. Wan Muna Ruzanna Wan Mohammad, a final year student also from the Department of Malay Language. Dyslexia is a specific type of learning disability where dyslexia sufferers have difficulty in identifying shapes and sounds of the alphabets. They experience difficulty in reading, writing, understanding, spelling and counting.

Assoc. Prof. Dr. Vijayaletchumy Subramaniam with the product – Phonics Tutor Software for Children with Visual Dyslexia in the form of a compact disc.

ATTRACTIONS OF PRPI 2011 – PHARMACEUTICAL FORENSICS AND NUTRIPRO

A research product known as the Environmental Forensics Technique to Detect Pharmaceutical Waste in Water was among the attractions during the Invention, Research and Innovation Exhibition (PRPI 2011) organised by Universiti Putra Malaysia (UPM). The innovation from the Coordinator of Environmental Chemistry, Marine Pollution and Chemical Forensics, UPM, Prof. Dr. Mohamad Pauzi Zakaria is able to detect pollutants dumped into the river or sea which consisted of personal human consumption materials such as soap, face cleanser and toothpaste.

"Pharmaceutical wastes that pollute the river and sea from daily human activities such as washing make-ups from our faces, will affect marine ecosystem as well as human's health. Fish will consume these substances where they will cumulate in fish fat. When we eat fish polluted from the pharmaceutical wastes, this will indirectly give adverse impacts on human especially on the children," he said. According to Prof. Dr. Mohamad Pauzi Zakaria, a lecturer in the Faculty of Environmental Studies, the method of detecting pharmaceutical wastes in the river and sea is vital to be applied in this country as the wastes will bring long term negative effects. The concern of Prof. Dr. Mohamad Pauzi on the environment leads him to win five gold medals for the Forestry and Environmental Research cluster. There are 104 gold medallists, 184 silver medallists and 177 bronze medallists from the exhibitions.

Prof. Dr. Mohamad Pauzi Zakaria won five gold medals for his work concerning the environment.

The ceremony was officiated by Prof. Ir. Dr. Mohd. Saleh Jaafar, Deputy Vice Chancellor (Research and Innovation), UPM. Apart from that, research product of Assoc. Prof. Dr. Loh Teck Chwen and Assoc. Prof. Dr. Foo Hooi Ling known as Nutripro, an animal feed additive that enhances growth, also managed to capture visitors' attention.

The product is produced to replace commonly used antibiotic by chicken breeders to accelerate chickens' growth. Dr. Loh noted that Nutripro is produced from a type of bacteria – *Lactobacillus plantarum* by applying the fermentation system known as metabolites. It has many health benefits on domestic animals apart from increasing lactic acid in the animals' digestive system and reducing different bacteria or diarrhoea. Dr. Foo added that the probiotic metabolites do not have any side effect on human.

What UPM Research and Development Sdn. Bhd. has to offer?

Universiti Putra Malaysia as one of the leading Research Universities in Malaysia, has a special role to play with regard to technology transfer. In order for UPM's inventions and technologies to move from the university laboratory to the consumers, a number of steps need to be successfully accomplished. The technology must first be protected. Then it must be transferred to a place that provides assistance in technology transfer for validation, production and commercialisation. This is where UPM Research and Development (UPM R&D) Sdn. Bhd. comes in.

UPM R&D Sdn. Bhd. is wholly owned by UPM Holdings Sdn. Bhd., a subsidiary company of UPM. It is formed to act as a technology transfer office of UPM to generate income through commercialisation activities. The role of commercialisation, which was initially the responsibility held by the Innovation and Commercialisation Centre, UPM has been taken over by UPM R&D starting from 1st April 2011. With its role in providing technology transfer service, UPM R&D acts as a private entity to match UPM, an intellectual property owner, with companies that are able to employ inventions and technologies of UPM to generate revenue and wealth to benefit both parties.

The role of UPM R&D encompasses a variety of activities such as:

- identifies potential licensing opportunities for intellectual property developed at UPM. This includes patented ideas,copyright works and know-how or trade secrets. Every effort is required to negotiate licensing agreements which are to the advantage of the inventors and UPM;
- valuates intellectual property for market value and business risk. Potential technologies are selected to be transferred to the market based on the valuations;
- forms Strategic Business Units (SBUs) to nurture new potential companies (pre-incorporation) until the management teams are mature and experience enough to run their full blown companies; and
- forms new spin-off companies under UPM R&D by providing spaces and technical support for the companies.

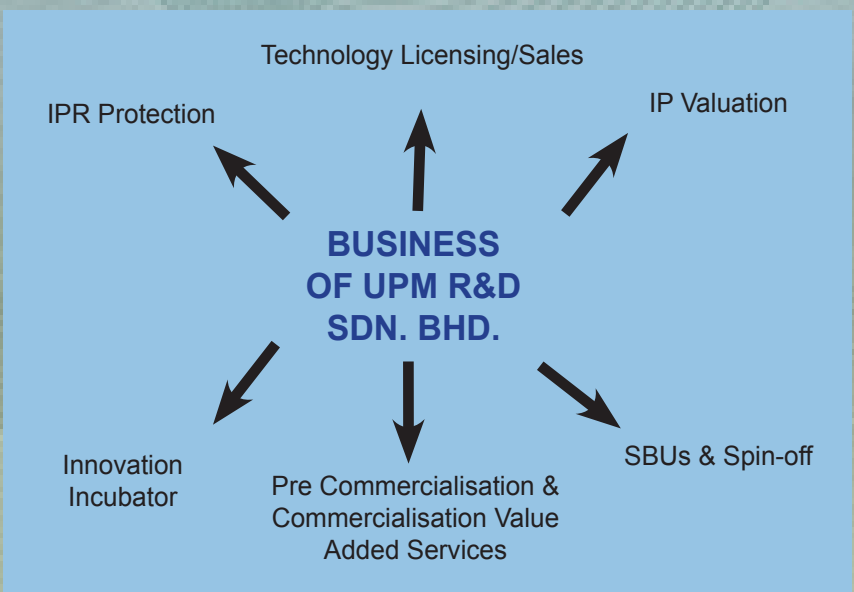


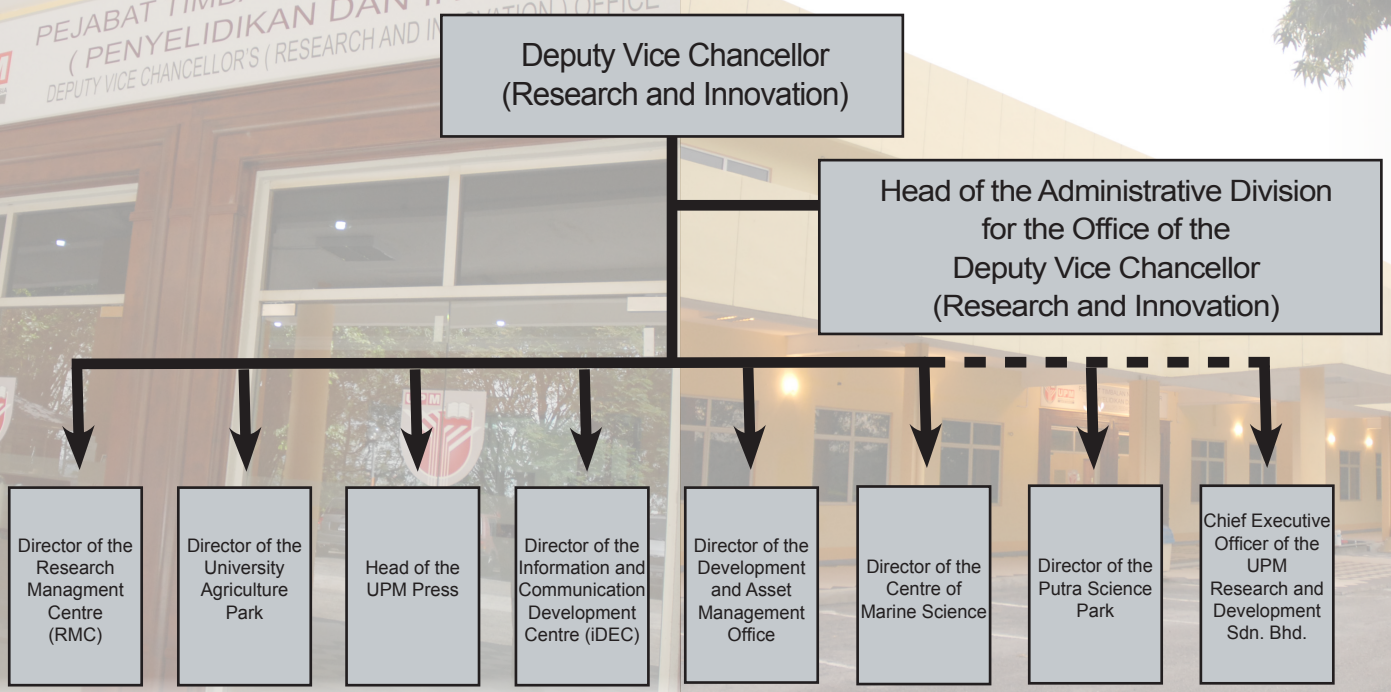
Figure 1: Services offered by UPM R&D Sdn. Bhd.

Reader Enquiry

Rajeswari Murugayah

UPM Research and Development Sdn. Bhd.,Blok F2, UPM-MTDC Technology Centre, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.
E-mail: rajesicc@gmail.com

Office of the Deputy Vice Chancellor (Research and Innovation)



Office of the Deputy Vice Chancellor (Research and Innovation)	Administrative Division for the Office of the Deputy Vice Chancellor (Research and Innovation)	Research Management Centre
The Office of the Deputy Vice Chancellor (Research and Innovation) manages research and innovation affairs as well as commercialisation activities of the university. The office manages and monitors research grants, oversees infrastructures and facilities development, promotes research output and facilitates UPM researchers in quality and cost-effective intellectual property protection. The office also oversees high quality publications which include academic books, journals and proceedings besides providing services regarding publication funds and incentives. In addition, it aims to provide a sustainable ICT-based environment throughout the university and monitors research, teaching, training and consultation in the fields of science marine and agriculture as well as technology transfer activities.	The Administrative Division consists of four main sections - Human Resource Management and Development Section, Financial and Facilities Services Section, Information and Communication Technology Section and Quality Assurance Section. The Human Resource Management and Development Section manages staff training, in-service evaluation and career guidance for staff. The Financial and Facilities Services Section monitors management expenditure activities and ensures that all expenditure allocations are used accordingly. The Information and Communication Technology Section on the other hand manages, designs, develops and maintains the office's computerised data processing system while the Quality Assurance Section manages and coordinates workflow management (secretariat) for the Quality Assurance Committee and other committees related to the Quality Management System (SPK).	The Research Management Centre comprises four main divisions – Research Grant Division, Intellectual Property Division, Promotion Division and Knowledge Management Division. The Research Grant Division is responsible for the management and administration of research fundings and related activities while the Intellectual Property Division is responsible for activities regarding managing, drafting and filing processes with regard to intellectual property protection in Malaysia and also in foreign countries. The Promotion Division seeks ways to enhance UPM's research excellence through organising and promoting research exhibitions at both national and international levels whereas the Knowledge Management Division develops and manages a knowledge management system known as the UPM Knowledge Management (KM) Portal.

.....To be continued in Synthesis Issue 35, December 2011

NutriPro
- Animal Feed Additive

Product Benefits

- complies to the Malaysian Feed Act 2009
- an animal feed additive in particular for the production of meat producing livestock such as poultry
- derived from the lactic acid bacteria fermentation
- contains probiotic metabolites, a safe ingredient for animal diets that possesses broad inhibitory spectrum, temperature and pH stability
- improves growth performance as well as carcass composition and appearance
- enhances immune response
- increases probiotic lactic acid bacteria counts
- maintains overall animal health
- has lower pathogenic Enterobacteriaceae counts and plasma cholesterol

Product Awards

- **Gold medal** - International Exposition of Research and Inventions of Institutions of Higher Learning (PECIPTA 2009)
- **Gold medal** - UPM Invention, Research and Innovation Exhibition (PRPI 2009)
- **Bronze medal** - Invention and New Product Exhibition (INPEX 2010)

Reader Enquiry
Foo Hooi Ling
Department of Bioprocess Technology, Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.
Tel: +603-8946 7476 E-mail: hlfoo@biotech.upm.edu.my

CNG COMPOSITE TANK

- Tank for natural gas storage in 'Natural Gas Vehicle' (NGV)

Product Benefits

- reduces dependability and demand for petrol
- increases safety of the country's source of power
- reduces emissions and improve air quality
- can save petrol up to 65%
- 25% discount on road tax
- lower maintenance cost

Reader Enquiry

Fakhru'l-Razi Ahmadun

Faculty of Engineering,
Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.
Tel: +603-8946 6262/6304 E-mail: fakhrul@eng.upm.edu.my

Synthesis BACK ISSUES

DECEMBER 2009 - Issue 27, 4th Quarter

Editorial: Quantity vs Quality in Academic Publication
Facts & Figures: Research Exhibitions and Awards Received
Research Highlight: A New VPO Catalyst for a Sustainable Environment

Regulars
- Tunable Range Enhancement of Multi-wavelength Brillouin-erbium Fibre Laser for WDM Systems
- Usage of CpG-free Plasmids for Gene Therapy - Reduced Inflammation and Sustained Pulmonary Gene Expression
- MgB2 - The Next Generation of High Field Magnetic Material
- Emerging Infectious Diseases - A Peril to the Livestock Industry
- A New UWB Filter for Higher Speed Communication
- *Bifidobacterium pseudocatenulatum* G4: A Potential Probiotic for Gut Health

Research Happenings
- PECIPTA 2009

Reportage
- NewsBriefs

MARCH 2010 - Issue 28, 1st Quarter

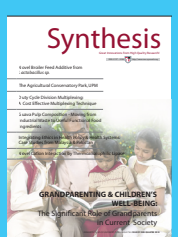
Editorial: Exhibitions and Promotional Schedule
Research Highlight: Applied Magnetics - Its Rapid Revolution

Regulars
- Optically Quenched Wide-gap Semiconductor Crystals Evaluation using Single- and Two-photon Excitation
- Andrographolide Derivatives - Suppress the Growth of Cancer Cells
- Quicker Peeled Fruits and Vegetables for Everyone!
- An Efficient Technology to Control Ammonia Pollution
- Nucleotide Probes - For Quicker and Faster Detection of *Candida* Infections
- Affinity Precipitation - The Latest Discovery

R&D&C Happenings
- MTE 2010
- A Working Visit by the Minister of Agriculture & Agro-based Industry
- MURoC 2010
- Cancer Awareness Carnival (3K)

Reportage
- NewsBriefs

JUNE 2010 - Issue 29, 2nd Quarter



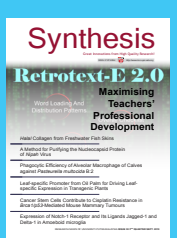
Editorial: Facts & Figures 2010
Research Highlight: Grandparenting & Children's Well-being: The Significant Role of Grandparents in Current Society

Regulars
- Integrating Ethics in Health Policy & Health Systems: Case Studies from Malaysia & Pakistan
- Novel Cation Interaction by Thermoalkalophilic Lipase
- Duty Cycle Division Multiplexing: A Cost Effective Multiplexing Technique
- Novel Broiler Feed Additive from *Lactobacillus sp.*
- The Agricultural Conservatory Park, UPM
- Guava Pulp Composition – Moving from Industrial Waste to Useful Functional Food Ingredients

R&D&C Happenings
- Malaysia Green Forum
- Natural Gas Vehicle (NGV) Front Platform
- Agricultural Technology for Farmers
- World Engineering Congress 2010 (WEC 2010)

Reportage
- NewsBriefs

SEPTEMBER 2010 - Issue 30, 3rd Quarter



Editorial: Pursuit of a New Indicator: *h*-index
Research Highlight: Maximising Teachers' Professional Development through RETROTEXT - E

Regulars
- Cancer Stem Cells Contribute to Cisplatin Resistance in *Brca1/p53*-Mediated Mouse Mammary Tumours
- Expression of Notch-1 Receptor and Its Ligands Jagged-1 and Delta-1 in Amoeboid microglia
- Phagocytic Efficiency of Alveolar Macrophage of Calves against *Pasteurella multocida* B:2
- *Halal* Collagen from Freshwater Fish Skins
- Leaf-specific Promoter from Oil Palm for Driving Leaf-specific Expression in Transgenic Plants
- A Method for Purifying the Nucleocapsid Protein of *Nipah* Virus

R&D&C Happenings
- UPM's Latest Products and Innovations
- Awarding Young Scientist in Shanghai

Reportage
- NewsBriefs

DECEMBER 2010 - Issue 31, 4th Quarter

Editorial: The Management of Marine Ecosystem
Research Highlight: Sustainable Nanocoatings Surface

Regulars
- Molecular Networks Involved in Mouse Cerebral Corticogenesis and Spatio-temporal Regulation of *Sox4* and *Sox11* Novels Antisense Transcripts
- Magnesium Deficiency is Good for Magnesium Diboride
- Great Literary Works of the Malay Language by Raja Haji of Johor-Riau in the 19th Century
- Shortcut and Rapid Protocol of Isolating and Developing DNA Microsatellite Markers for Rivers Catfish
- Treatment of Oilfield Produced Water for Recycling and Beneficial Reuse
- Formulation of Tropical Lignocellulose *Kenaf* Fibre Compound for Malaysian Cars

R&D&C Happenings
- UPM's Awards Winning Products and Innovations

Reportage
- NewsBriefs

MARCH & JUNE 2011 - Issue 32 & 33, 1st & 2nd Quarter

Editorial: A Green Conscience towards a Green Campus
Research Highlight: Healing Power of Malaysian Seaweeds

Regulars
- Chemometric Approach to Validate Faecal Sterols as Source Tracer for Faecal Contamination in Water
- A Low Glycemic Index Diet: New Insight into the Management of Diabetes
- Transport and Release of Chemicals from Plastics to the Environment and Wildlife
- Generation and Characterisation of Mesenchymal Stem Cells Derived from Human Myocardiac Tissues
- New Solar Cell Materials from Ternary Chacogenide Compounds
- Ruminants to Poultry: Beneficial Microbe and Gene

R&D&C Happenings
- UPM's Latest Products and Innovations
- UPM Produces Low Sodium Salt

Reportage
- NewsBriefs

Office of the Deputy Vice Chancellor
(Research and Innovation)
UNIVERSITI PUTRA MALAYSIA