

A quarterly palm oil newsletter brought to you by
 IChemE Palm Oil Processing Special Interest Group

POPSIG

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2018 Q3

POPSIG

NEWSLETTER



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Editor's Message

As the new Malaysian government settles down we are pleased to see climate change regain focus. As you will read inside it is a priority of the new Minister of Energy, Technology, Science, Climate Change and Environment. The Minister of Primary Industries has on 4/9/18 reiterated that the government was committed to maintaining at least 50% of the land as forest cover. Whilst some said this is unwise many including POPSIG and MPOA (Malaysian Palm Oil Association) welcomed this confirmation. MPOA says that oil palm yield enhancement is the future direction of Malaysian plantation companies to reduce the cost of production and increase the competitiveness of Malaysian palm oil in the international markets. Interestingly Indonesia has just issued a 3-year moratorium on new oil palm plantation.

The above developments dovetailed into POPSIG's 2nd Regional Palm Oil Processing Seminar on 5/9/18 and it is reported in detail inside. The theme of the seminar was "Value addition in the palm oil downstream sector". On 2 July 2018, Minister of Primary Industries, Teresa Kok, confirmed that part of her focus would be on increasing the number of high value-added products from the downstream plantation commodities sector. She said, "The function of this Ministry is to ensure the continuity of commodity industries across the value chain from upstream to downstream, and that will be my priority, centering around conservation of environment and national biodiversity."

At the seminar in his keynote address CEO of the Malaysian Palm Oil Council, Datuk Dr Kalyana Sundram, urged chemical engineers to play a bigger role in the palm oil industry and he extended his call to include in plantations. Whilst POPSIG concentrates on downstream processing it will take up this challenge and hopes that companies upstream will also invite more chemical engineers into their organizations. Understandably much of the seminar's spotlight was on the current food safety issue of 3 MPCD and 2GE but speakers also spoke on adding value through increasing processing yields, sustainability and consistent high quality throughout the supply chain aided by digital technology.

The POPSIG committee for 2018/19 is now complete and I would like to welcome 2 new members, Teoh Jay Kee and Ho Jia Lynn to the editorial board.

POPSIG promotes industries and academics collaboration where Monash-Industry Palm Oil Education and Research (MIPO) continues to receive support from POPSIG as MIPO identifies potential for growth. This year, POPSIG would like to proudly announce financial assistance will be given to palm oil processing associated events. The financial assistance is divided into 2 main categories: student bursaries and best final year design award. Further details and application requirements can be found in the newsletter.

RSPO's EURT 6 seems well received with greater than 400 participants but overall it was rather uneventful. The main focus of the conference was placed on meeting the EU target, addressing UN SDG (sustainable development goals), jurisdictional approach and the P&C (Principles & Criteria) review.

The first webinar from outside Malaysia was successfully run by Prof. Paulo Cesar Narvaez Rincon from the National University of Colombia. This webinar highlights the potential of implementing academic research to industries where the hollow fiber membrane in the co-current Liquid-Liquid Film Reactor introduced by Prof. Paulo and his team shows substantial achievement in pilot scale study. Future improvements are ongoing in order to meet industry requirement. Biotechnology is a growing sector where chemical engineers can dwell upon as can be seen by the talk from Dr. Ahmad Parveez bin Ghulam Kadir of MPOB.

We would also like to take the opportunity to congratulate Prof. Ir Dominic Foo, Mustafa Kamal Tun Abdul Aziz and their team for publishing their new book titled "Green Technologies for the Oil Palm Industry". The book is now available for purchased and from online bookstores, do take a read!

A big round of applause to the finalists for the Palm Oil Industry Award 2018 and Student Chapter Award. Thank you for all the effort that you have put in. We wish you all the best and good luck!

Last but not least we bring you Dr Mahathir's speech at the 73rd UNGA where he brings the palm oil industry's plight to the attention of the United Nations.

We thank you for your continued support of POPSIG.

Editor
Tan Hui Min

For further information about POPSIG including how to join please contact the Secretary Assoc. Prof. Dr Wu Ta Yeong at wu.ta.yeong@monash.edu

RSPO's EURT 6 – a quiet conference in Paris

This year's conference at Palais des Congrès de Paris from 25 – 26th June was attended by over 400 participants. The week looked to be rather busy with the P&C Review, the conference itself and the Amsterdam Declarations meeting following. Just a fortnight before French farmers blocked access to oil depots and refineries in protest over plans to allow Total to use imported palm oil at a biofuel plant. But it was an uneventful conference.

The conference theme called for greater inclusivity throughout the palm oil supply chain. Whilst Europe is the leading market for sustainable palm oil, it remains of hot topic of debate there. Participants addressed the following key issues

- meeting the EU target of 100% sustainable by 2020 (now 59%)
- addressing labor and human rights issue within the context of UN's SDGs (Sustainable Development Goals)
- the jurisdictional approach
- the P&C (Principles & Criteria) review

There is increasing recognition of the role of governments and their support especially in getting small holders on board but also demand for sustainable palm oil which is levelling at 19%.

The draft restructured P&C looks very much improved and easier to use. The market does not seem to want RSPO NEXT and there was a view that with the new P&C there may not be the need for RSPO NEXT as it includes a new No Deforestation Requirement. Whilst there was a lot of reference to Shared Responsibility and welcoming it, it was done in a very broad context with no specifics yet.

The next conference is RT 16 and this will be held in Kota Kinabalu, Malaysia from 12– 15th November 2018.



1



2



3



4

1. The P&C review group session in progress.
 2. Breakout Session 2: Up-scaling Our Shared Commitment
 3. Plenary : RSPO Principles & Criteria Review 2018

4. Plenary : Reflection On How To Make Palm Oil the Norm in Europe & Emerging Markets as a Shared Responsibility

MIPO - Catalyzing Industry-University Collaboration in Palm Oil Processing

Background

The palm oil industry has been a main driver of economic growth and rural development to this region of the world. Collectively, Indonesia and Malaysia produce close to 90% of the world's palm oil production. Due to its versatility, palm oil has far-reaching economic impacts globally because billions of people worldwide could be using products containing palm oil or its derivatives on a daily basis, from foodstuffs to fuel, and from detergent to plastic.

Malaysia, being a pioneer in the palm oil business, is currently a global technology leader in palm oil processing. However, the local palm oil industry is facing numerous challenges such as increasing competition from other edible oil producing countries, stricter regulations in food safety and intensifying environmental pressure. To overcome these challenges, the Malaysian palm oil industry must continue to develop new technologies, new products and new approaches in order to move up the value chain and to be sustainable.

About MIPO

However, many local industry players are conservative and are reluctant to undertake research and development because of the risk involved, and the lack of resources and experience to manage research facility and scientists. Recognizing this barrier, Monash University Malaysia (MUM) has recently established MIPO (Monash-Industry Palm Oil Research Platform) to facilitate and catalyze university-industry linkages to jointly address the key problems facing the palm oil industry.

MIPO is currently directed by Prof. Chan Eng Seng, who is also the Department Head for Chemical Engineering at MUM. The platform is a network of 10 research groups at MUM with multidisciplinary expertise in the areas of engineering, science, pharmacy, business, and social sciences. The research projects undertaken by MIPO are industry-driven and are conducted in collaboration with industry. Interdisciplinary collaboration is encouraged to promote 'outside-the-box' thinking to address problems which remained unresolved or are increasingly more complex.

Joint Research facility

MIPO is developing a joint R&D facility dedicated to oils and fats research which can be shared with the industry. The R&D facility consists of an analytical laboratory and a 'Design-and-Build' space. The analytical laboratory houses analytical equipment such as GCMSD, GCFID, HPLC, Rancimat, Autotitrators, Lovibond, etc. The 'Design-and-Build' space mimics a factory workspace and it is developed to address the research gaps in process development and scale-up. Currently, MIPO has various modular-based lab-scale unit operations such as reactor, distillation column, deodorizer, hydrogenator, homogenizer, spray-dryer, and microfluidic spray dryer. The modular system allows flexibility to 'mix and match' different unit operations for the development of new processes or optimizing the existing ones. MIPO also has a 'mini' pilot-scale oleochemical production facility that is co-developed with industry to support scale-up studies (see picture).



1. MIPO Analytical Lab for Oils and Fats Analysis



2. MIPO 'Design-and-Build' Space for Process Development

Role of Chemical Engineering

Since chemical engineers are equipped with strong knowledge of fundamental science and process engineering, they are in a natural position to drive the next wave of innovations in the palm oil sector. One of the innovation strategies is to introduce newer areas of chemical engineering such as biotechnology and nanotechnology into palm oil processing and product development.

For instance, more chemical companies are now looking to biocatalysis to improve the sustainability of their manufacturing. For example, Arkema in Malaysia is currently funding MUM a multi-million Ringgit research programme to develop an efficient biocatalyst for their process. In the edible oil sector, recent advancement in enzyme technology and the adoption of innovative business model by enzyme suppliers have created the opportunity for enzyme application at industry scale. MIPO is currently working closely with industry to explore future applications and to up-scale laboratory processes.

Nanotechnology will also impact the industry. For example, nanostructured materials can be applied to speed-up reactions, improve oil-water separation or wastewater treatment. The advancement of process technology has also enabled the preparation of nanoemulsions which have been applied in the development of innovative food products, nutraceuticals and cosmetics. Recently, the formation of emulsions stabilized by colloidal particles, or the so-called 'Pickering emulsion' has gained increasing scientific attention. The understanding of Pickering emulsion may help to reduce oil loss during the milling process or to develop 'designer emulsions' for new applications.

For more information, please contact Prof. Chan Eng Seng (chan.eng.seng@monash.edu) or visit our website at <https://www.monash.edu.my/research/priorities>

Breakthrough Research: Hollow Fiber Membrane in Liquid-Liquid Film Co-Current Reactor For Biodiesel



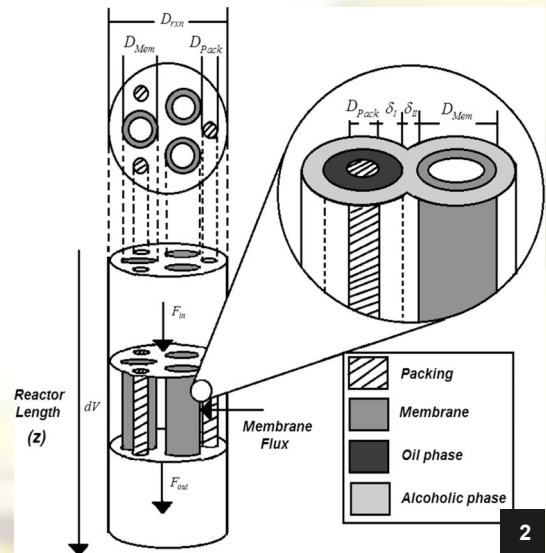
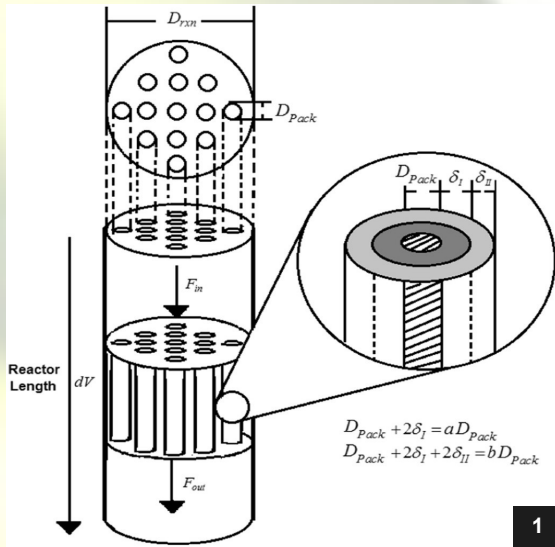
Dr. Paulo César Narváez Rincon explaining on the Liquid-Liquid Falling Film Reactor designed by him and his research team

POPSIG committee successfully worked hand in hand together and invited Dr. Paulo César Narváez Rincon from National University of Colombia to put up a webinar on 23rd July 2018 (Tuesday), 6.30pm to 7.30pm MYT. Producing Biodiesel with Liquid-Liquid Film Reactor was the presented topic based on the research by Dr. Paulo and his research team from National University of Colombia.

The Co-Current process based on Dr. Paulo and team's initial research for trans-esterification process with the aid of catalyst, has been well-adopted in the production of biodiesel using liquid-liquid film reactor (LLFR) in Colombia. Due to the increasing demand of biodiesel in Colombia, LLFR are used to replaced away batch reactors besides giving higher yield, productivity, eliminating agitation and many separation processes thus saving costs, time and spaces. This co-current method is 3 folds better than the conventional ones and also it was found that, higher packing of columns in the reactor is able to increase productivity and yield. Figure 1 shows the structure of a Co-Current LLFR. To further improve from the current state, a new method has been proposed by Dr. Paulo and his team by introducing Counter-Current instead of the Co-Current reaction process. No doubt, this process reduces the ratio of methanol to palm oil while giving better yields and productivity.

However, a major industry breakthrough has once again been achieved by Dr. Paulo and team which is by introducing Hollow Fiber Membrane (HFM) in the Co-Current LLFR giving a combination of LLFRM. It was found that, HFM helped reduced resident time thus saving time, lowering the size of reactor and gives even higher yield and productivity compared to LLFR with Co-Current only and Counter-Current. Figure 2 shows the structure of LLFRM. The presence of HFM acts as a separator for biodiesel from glycerol thus thrusting the reaction to further go on (Le Chatelier Principles).

LLFRM is currently still under a pilot scale and further improvement to replace sodium methoxide to a recyclable catalyst is still under process in order to meet the industry requirement which Dr. Paulo and team are still working on.



1. M.A. Noriega, P.C. Narvaez, J.G. Cadavid, A.C. Habert, Modelling of biodiesel production in Liquid-Liquid Film Reactors including mass transfer effects, Fuel Processing Technology, 167, 2017, 524—534.
2. M.A. Noriega, P.C. Narvaez, J.G. Cadavid, A.C. Habert, Simulation and validation of biodiesel production in Liquid-Liquid Film Reactors integrated with PES hollow fibers membranes, Fuel, 227, 2018, 367—378.
3. Liquid-liquid falling film reactor
4. Experimental result LLFR with membrane

Biotechnology and Breeding—An Introduction for Chemical Engineers

POPSIG evening talk on Monday, 13th of August was presented by Dr. Ahmad Parveez bin Ghulam Kadir, Deputy Director General R&D of Malaysian Palm Oil Board (MPOB), titled “Research on Oil Palm Biotechnology and Breeding – An Introduction for Chemical Engineers”. The talk was held at Monash University Malaysia with a simultaneous webinar.

The presentation was divided into 5 main sections namely: oil palm processing; oil palm germplasm; oil palm breeding; biotechnology – clonal propagation and biotechnology – genetic modification. Dr. Parveez first explained the breakdown from oil palm fruits, what and how much was recovered from it annually. Mesocarp: crude palm oil (4 t/ha/yr); Kernel: palm kernel oil (0.5 t/ha/yr) and palm kernel cake (0.5 t/ha/yr). Explanation was also given on the physical refining and fractional process of oil palm.

Next, an overview of the genetic resources of MPOB alongside main seed producers in Malaysia was presented. Strategies for crop improvement in particular strategy 1: enhance upstream productivity and strategy 9: enhance value downstream was highlighted. Both involve the incorporation of biotechnology in order to achieve the desired results as well as right breeding strategies to produce high yielding planting materials.

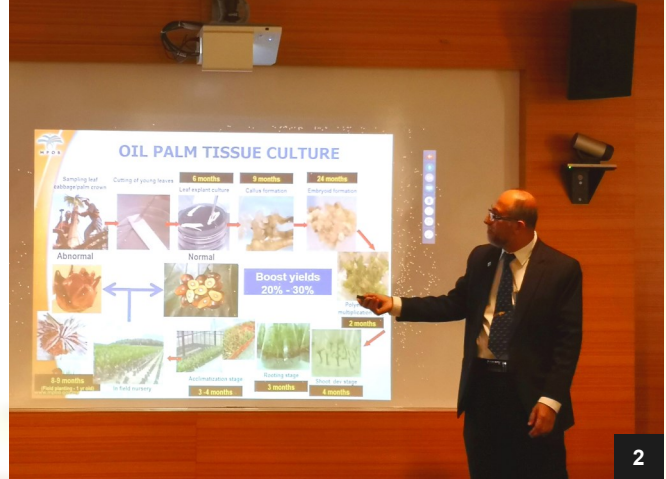
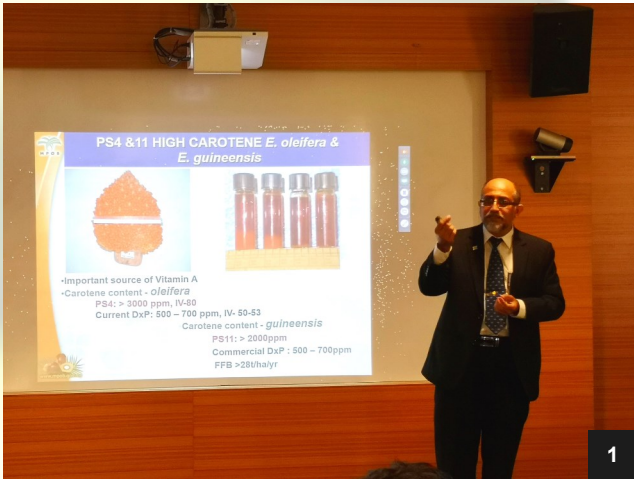
The main emphasis for the genetics of oil palm seed production was placed in the Dura (homozygous wild type) and Pisifera (Homozygous mutant) species which were cross-breed to produce Tenera (Heterozygous co-dominant). The Tenera species were planted and tested out for a few cycles. A comparison study and performance from different cycles but of the same genetic background were evaluated. Successful breeds were then transferred to the oil palm industry. The Tenera species shows various improvements in terms of higher fresh fruit bunch yield, greater oil yield up to 8t/ha, more unsaturated and liquid palm oil with a high iodine value, high oleic acid, high protein kernel, high bunch index and longer stalk just to name a few.

Oil palm tissue culture was also given a brief overview where through this method, it is claimed to be able to boost palm oil yields by 20 to 30%. Cloning of the fast track breeding programme also shows favourable traits such as low height, high Vitamin E and high bunch index.

Targeted products from biotechnology of oil palm are:

- High oleic acid oil
- High stearic acid oil
- Biodegradable plastics
- Lycopene-enriched oil
- High palmitoleic acid oil
- High ricinoleic acid oil

Dr. Parveez also gave a summary on the step to produce transgenic plants together with the fatty acid analysis performed. Lastly, Dr. Parveez concluded his speech which emphasized on the potential of higher yield and metabolites from germplasm collection; tissue culture to fast track and genetic manipulation for new characteristics not found in nature.



1. Dr. Parveez explaining on palm strategy to achieve desired outcomes
2. Dr. Parveez highlighting how through tissue culture, palm oil yields can be greatly increased
3. Audiences listening attentively to Dr. Parveez’s speech
4. Mr Qua Kiat Seng posing a question to the speaker
5. Prof. Chan Eng Seng raising a question to the speaker
6. Mr Qua Kiat Seng presenting the certificate of appreciation to Dr Parveez

Process safety in the palm oil refining industry – is it necessary?



**Trish Kerin, Director,
Institution of Chemical Engineers Safety Centre (ISC)**

Trish is a Chartered Engineer, a registered Professional Process Safety Engineer and Fellow of IChemE. She also holds a diploma of OHS and is a graduate of the Australian Institute of Company Directors (GAICD). Recent awards include the Engineers Australia – John A Brodie Medal – for best paper at the *Asian Pacific Confederation of Chemical Engineering Congress 2015* (incorporating Chemeca). The award recognises Trish’s peer reviewed paper on *Process Safety Competency*.a

This is my second article where I would like to discuss the concepts of process safety in the palm oil industries. We often think of chemical or oil and gas industries when thinking about process safety, and that is partly because that is where we have seen some of the most significant incidents. But there are several instances of loss of control events that have resulted in tragedy for those involved in the palm oil industries.

Let’s look at what could possibly go wrong in the palm oil refining industry, and how these can be described as a process safety loss of control.

There are several units contained in palm oil processing, and this includes items such as packaged boilers. We often assume that as a packaged unit, we don’t need to worry about process safety as that has all been taken care of, but the fact is the units still need proper maintenance and testing.

About a decade ago there was a boiler explosion in a palm oil refinery, resulting to two fatalities. The boiler that exploded was an older one, with a mostly manual control system. The boiler was a backup system used when the biomass plant was not operating. It was known to have burner issues, resulting in unequal combustion occurring. Because of this it was often operated in manual mode and this overrode some of the safety devices. The fan cut off did not trigger and the fuel shut off also did not work. There was a second boiler installed and they shared the water supply system. The water back flowed from one boiler to the other and because of the manual operation mode and the low water level cut off failed to trigger. The low water level resulted in the boiler overheating and then exploding.

Managing the burners as well as the water level is critical when operating a boiler, regardless of how it is configured. Let’s look at the boiler control system. When the boiler was being operated in manual mode the control system safety devices were effectively bypassed. In this instance we saw a weak signal of the unequal combustion in the burners. If it was necessary to operate the boiler in manual mode, why did this render the safety controls ineffective? Considering the safety control system, how was testing being conducted on the low water level interlock to be assured it would work if needed? How was the fuel cut off being tested to ensure that if the burners needed to shut in an emergency that it would work? And how was the electrical and instrumentation control system maintained to ensure it continued to function when needed?

Process safety looks at all of these factors and helps manage the integrity of the equipment. When the boiler was designed, was it made to the correct specifications and have an effective control system that could not easily be bypassed? How was the control system maintained and tested to ensure that if called upon the safety shutdown devices would work as intended? These are some of the questions that need to be addressed to help manage process safety. This about your own boilers, how are they controlled and how do you ensure that the safety devices will work when needed?

To effectively manage process safety, it is necessary to have the right competencies in the workforce and understand how it can impact your business. The IChemE Safety Centre has developed a competency guidance document that defined what specific competencies are needed for each type of role in an organisation. This document is a free download from the following site <http://bit.ly/ISCKC> The Occupational Health and Safety Body of Knowledge has also released two chapters that discuss chemical hazards and management of process safety. These can be accessed free from the following site <http://bit.ly/ISCBOK1> and <http://bit.ly/ISCBOK2>

'Student Bursaries' and 'Best Final Year Design Award' from POPSIG

Palm Oil Processing Special Interest Group (POPSIG) provides financial assistance in a form of student bursaries to undergraduate and postgraduate students to attend scientific conferences, workshops or forums which are related to palm oil processing. The main objectives of such assistance are to spur the students' motivation and support their research in palm oil processing. The student bursaries contribute towards the registration, travel and accommodation costs to help make the palm oil processing conferences or events more accessible to the students.

Each year, POPSIG awards Best Final Year Design Award to a group of final year students, whose final year project design revolves around palm oil processing. The main objective of this award is to encourage the universities to introduce palm oil processing design for their final year students. The selection of Best Final Year Design Award is based upon a palm oil processing design which reflects on efficiency, values inherent safety and mitigates environmental impacts, and demonstrates project viability to the palm oil industry.

The detailed requirements to apply for POPSIG 'Student Bursaries' and 'Best Final Year Design Award' are:

Student Bursaries

1. Only activities associated with palm oil processing will be supported.
2. A supervisor's report must be included with your application by a separate email, confirming your suitability to attend the conference and your status as an unsalaried member of your department/university.
3. Bursaries are awarded competitively to cover part of the cost of registration, travel and accommodation only. The decision of the POPSIG is final.
4. Bursaries are awarded up to a maximum value of RM1000 per event. A maximum of five bursaries will be offered annually.
5. Applications are reviewed throughout the year. Applications must be received before the conference starts, at least 6 months before the conference, workshop or forum. Enough time must be allowed by the applicant to meet these review dates.
6. Payment can only be authorised after the event and will only be made against receipts for the items listed above.
7. A conference report shall be submitted by the participant with the claim for expenses. The report should be 500-1000 words long and cover the key papers presented at the conference, the relevance of the conference to the participant's own work and any other points of interest. The report may be published in the POPSIG Newsletter.
8. Successful applicants are required to include the acknowledgement of the POPSIG's support.

Best Final Year Design Award

1. Only final year project design which is associated with palm oil processing will be considered.
2. The design may involve either up-stream or/and down-stream palm oil processing, including improvement of current technologies or introduction of new technologies.
3. A design lecturer's report must be included together with the application by a separate email, confirming the status of the students who have taken the final year project design from a university.
4. The design submitted shall be original and have not been previously submitted or published. POPSIG only considers one application per university.
5. Award is awarded up to RM2000 per group and only one group will be awarded per year. Each student in the winning group will be given a Design Award Winning Congratulation Certificate by POPSIG. The decision from the POPSIG is final.
6. Applications for submission are announced in 1 October each year and closed in 1 March for the following year. The winning team will be announced after two months the closing date of application.
7. In general, the design project will be evaluated based upon the structure and technical content of the proposed palm oil processing. Key criteria for the evaluation could be ranged from the comprehensiveness of the analysis until the applicability of the design to be applied in a real palm oil industry.
8. If no winning team for a particular year, the award money will be channelled and used as student bursaries.

Applications may be made by filling in and sending the form to Mr. Hong Wai Onn (email: hongwaionn@gmail.com), Mr. Qua Kiat Seng (email: ksqua@hotmail.com) and Assoc. Prof. Wu Ta Yeong (email: wu.ta.yeong@monash.edu)

A New Book on Green Technology for the Oil Palm Industry

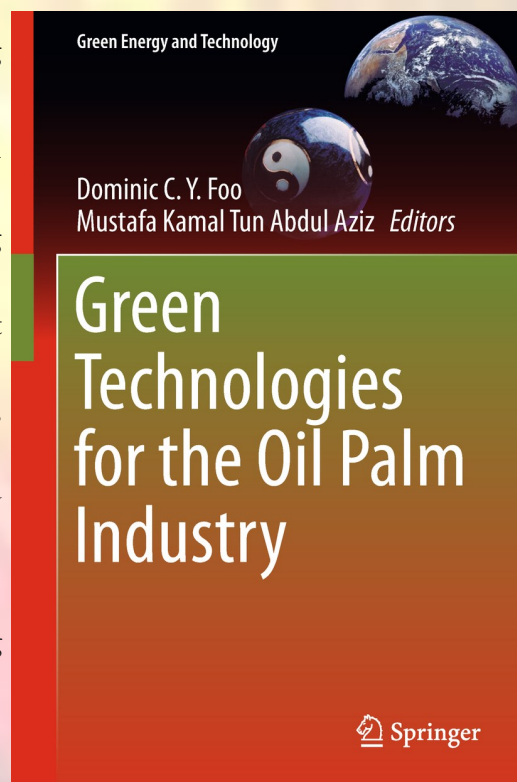
A group of local academics have made an effort to publish a new book with an international renowned publisher – Springer Nature, focusing on various green technologies for the oil palm industry. Editors of this new book are Prof Ir Dr Dominic Foo and Mustafa Kamal Tun Abdul Aziz from University of Nottingham Malaysia Campus. Dominic Foo is also the Fellow of the IChemE, and the Malaysia Chapter Lead for the Education Subject Interest group (EdSIG). Other chapter authors include Prof Mei Fong Chong (Exco member of Palm Oil Subject Interest group – POPSIG), Prof Denny Ng, Dr Nishanth Chemmangattuvalappil, Dr Yi Jing Chan, Dr Bing Shen How (all from University of Nottingham Malaysia Campus), Dr Viknesh Andiappan (Heriot Watt University Malaysia Campus), etc.

A total of 8 chapters are included in the book, outlining the state-of-the-art advances of various aspects of the oil palm industry, ranging from palm oil milling processes to palm biomass utilisation. Apart from process development and intensification (e.g. oil recovery with bioethanol), some of the chapters also reported some ready-to-use computational and optimization algorithms for various purposes (e.g. calorific values estimation, biomass allocation, etc.) These will herald new style and strategies in building future palm oil processes that are efficient and innovative.

The book is now available for purchase from the publisher, as well as various online bookstores, e.g. Amazon, Book Depository, Alibris, etc.

Titles of All Chapters:

- Flowsheet Synthesis and Optimization of Palm Oil Milling Processes with Maximum Oil Recovery
- Alternative Solvent Design for Oil Extraction from Palm Pressed Fibre via Computer Aided Molecular Design
- Green Extraction Process for Oil Recovery Using Bio-Ethanol
- Palm Oil Mill Effluent (POME) treatment – Current technologies, biogas capture and challenges
- Numerical Methods to Estimate Biomass Calorific Values via Biomass Characteristics Index
- A Simple Mathematical Model for Palm Biomass Supply Chain
- An Overview of Palm Biomass Supply Chain Modelling
- Cooperative Game Theory Analysis for Implementing Green Technologies in Palm Oil Milling Processes



KLK Oleo again sponsors IChemE's Palm Oil Industry Award

We would like to express our deepest appreciation and acknowledgement towards **KLK Oleo** - a global oleo chemical producer, who has been supporting us the 2nd time as the sponsor for this award. Your kind support is the key that keeps us thriving for bigger success and breakthrough on palm oil processing in Malaysia!



Palm Oil Industry Award is one of the unique awards given out during IChemE Malaysia Awards. This award serves as a recognition to the individuals or companies that have been greatly involving themselves in the innovation work and technological breakthrough of palm oil processing in Malaysia, which currently does not gain enough awareness from the community. The official finalists for Palm Oil Industry Award 2018 are:

- IOI Acidchem Sdn. Bhd.- *Waste heat recovery VAC*
- IOI Bio-Energy Sdn Bhd - *Eco Fouling Project*
- IOI Bio-Energy Sdn Bhd - *Heat Recovery for Boiler*
- IOI Edible Oils Sdn Bhd - *Heat recovery using Vent Economizers*
- Sime Darby Research Sdn Bhd; Monash University Malaysia - *Palm Oil Washing with Bio-based Solution*

This award is given to the participant who has the best project implemented that demonstrates innovation, successful delivery and technical, commercial, safety and/or environmental benefit. The project could be related to new industrial plant or to the enhancement of existing palm oil mills, refining and other related industries.

New this year, the **Student Chapter Award** is given to IChemE Student Chapter with significant achievements and wide range of events such as industrial visits, networking and educational events, corporate social responsibilities and more! The official finalists for the Best Student Chapter Awards are:

- Curtin University Malaysia
- Heriot-Watt University Malaysia
- Monash University Malaysia
- Universiti Tunku Abdul Rahman (UTAR)
- Universiti Teknologi PETRONAS (UTP)

We would like to congratulate our members of POPSIG committee from UTAR and Monash University Malaysia competing as the finalists for the Student Chapter Awards.

The previous winners of IChemE Malaysia Palm Oil Industry Award:

Year 2015 (Sponsored by KLK Oleo):



'Palm oil olein yield improvement project'
Mr. Toh Seong Hin - Asst VP, Plantation Advisory – Refinery from Sime Darby Plantation Sdn Bhd. receiving the 1st Palm Oil Industry Award from Mr. Siew Fook Ming, Project Director of KLK Oleo.

Year 2016 (Sponsored by POPSIG):



'Re-engineering current palm oil degumming process'
Muhammad Saiful Nidzam Ismail of Sime Darby Research Sdn Bhd - Senior chemical engineer in Oils & Fats Refinery Technical Advisory Services Units receiving the Palm Oil Industry Award from Hong Wai Onn, Chair of POPSIG.

Year 2017 (Sponsored by Sime Darby):



'Novel integrated process for the extraction of phytonutrients and production of biodiesel from crude palm oil'

Chin Hui Ling and Lim Ching Yee from Excel-Vite Sdn. Bhd. receiving the Palm Oil Industry Award from Tuan Syed Said Syed Saggaf - Head of Sime Darby Biodiesel Sdn Bhd, Head of Sime Darby Kernel Crushing Plant, Head of Health & Wellness Business.

Biotechnology Award 2018

At the global level we are pleased to announce that a palm oil industry project “A New Bioreactor for Biogas Production from POME” has been shortlisted. This has been submitted by Havys Oil Mill Sdn Bhd, Centre of Sustainable Palm Oil Research (CESPOR), University of Nottingham Malaysia Campus, Eureka Synergy Sdn Bhd, Nottingham Green Technologies Sdn Bhd

This project has been selected as IChemE Global Award 2018 finalist. The team now has a chance of winning an IChemE Award for Biotechnology. The winner will be announced at IChemE Global Awards 2018 at The Principal, Manchester, UK on Thursday 1 November.

The Integrated Anaerobic-Aerobic Bioreactor (IAAB) is the only technology on the market that can convert palm oil mill effluent (POME) into high quality biogas and treated water for reuse/recycle simultaneously.

It is a self-sustaining system that produces net energy. It also significantly reduces greenhouse gas emissions as well as the footprint of equipment required by conventional POME treatment.

IAAB began development in University of Nottingham, Malaysia in 2008 at laboratory scale of 60L and now ten years on has achieved pre-commercialised scale of 3,000,000L

This technology has proven the value of close collaboration between government agencies, academia and industry partners.



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Recognises achievement, innovation and discoveries in the fields of biochemical, bioprocessing, bioengineering, bioenergy, biocatalysis, bioreactor and nanotechnology.

Entries should demonstrate existing or potential industrial application, especially in the healthcare, food, agriculture, energy, water and chemical sectors.

This is the link <https://www.icheme.org/events/icheme-awards/icheme-global-awards/categories%20and%20entry.aspx>

Report for Regional Palm Oil Processing Seminar – Value addition in the Palm Oil Downstream sector

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The Regional Palm Oil Processing Seminar held on 5th September 2019 at Renaissance Hotel, Permas Jaya is indeed another historical event added to the achievement of the IChemE Palm Oil Processing Special Interest Group (POPSIG) in creating a platform for the palm oil key players from the midstream and downstream processing sectors to exchange views and insights that were relevant to the main theme of the event titled “Value addition in the palm oil downstream sector”. The palm oil industry has been a key contributor to the GDP of Malaysia with an estimation of RM 80 billion in 2018. However, the crisis of low margins in the Palm Oil refining industry is putting an immense pressure on the upstream sector as the increase in production suffers conflict with price reduction. Furthermore, the Biodiesel downstream sector is facing huge hurdles due to tariff and non-tariff barriers in the export market.

As highlighted by Mr. U R Unnithan, the chairman of this seminar, in his opening speech, everyone in the palm oil industry has a role to play either in improving manufacturing efficiencies in creating new products out of R&D that helps to add more profit to the business. Mr. U R Unnithan also described chemical engineers as the important backbones of the downstream sector and urged them in contributing both technically and commercially to the industry.

Overview of the Challenges in Palm oil industry

Is palm oil a sunset industry in Malaysia? Datuk Dr. Kalyana Sundaram addressed this question as the problem in promoting Malaysian palm oil globally. The importance of palm oil viability and market availability need to be recognised to sustain its role and extend its opportunity in the oils and fats industry. Chemical engineers were urged to contribute their expertise especially in the area of mechanisation innovation to improve the stagnant production. The issue of oil palm sustainability regarding the banning of palm oil-based biofuels has created a tug of war between Malaysia and the European countries. In addition, the non-uniform quality of palm oil biofuels triggered disapproving noises from the west. Hence, investment and R&D efforts in introducing sustainable renewable energy is crucial. The third global agenda involves the peat conservation associated with high GHG emissions. Chemical advocacy and understanding on the dynamics of emission is what Malaysia lacks to overcome this challenge. The opportunity of sustainable regenerated palm oil based biofuel to satisfy aviation industry’s need in carbon footprint reduction induces challenges in providing assurance on the sustainability, production system and engineering facilities in the biofuels production.

As certification becomes a big business in aiding sustainability enforcement, innovation to achieve traceability in the palm oil supply chain is vital. To sustain this industry, innovative ideas are required in the process addition and active tackling of key issues in the industry should be initiated by all engineers.

Industry X.0

Ir. Qua Kiat Seng started his speech by giving a background information on the industry evolution. Today, industry has made its way into Industry 4.0 which involves cyber physical combination systems in production. However, the importance of connectivity in industry associated with the generation C is moving us beyond industry 4.0 to Industry X.0 by breaking the silos of sectors. Hence, the speaker visualised a future palm oil industry based on the concept of Industry X.0 by giving examples and encouraged delegates to apply such concept in the palm oil upstream and downstream sectors. It was suggested that the involvement of engineers is highly required in the building of Industry X.0 via contributing innovations and ideas of the future facilities and systems in breaking the silos within the palm oil industry as well as aiding system management after Industry X.0 is applied.

Promoting Industry-University Linkages in Palm Oil Processing

Prof Chan Eng Seng from Monash University emphasised the importance and challenges in university-industry collaboration to contribute in the innovation and value addition in the palm oil industry. In order to tackle the challenges in palm oil industry, R&D actions should be intensified to develop new technologies and products that move out of the value chain in a continuous manner. One of the solutions to support this goal is to encourage more universities to support industries' R&D activities. To promote the industry-university collaboration, he highlighted the importance of identifying and overcoming the key barriers to the collaboration in terms of motivation, communication, legal matters, IP interest, funding and project duration.

New Sustainability Initiatives (MSPO)

According to Dr. Sanath Kumaran, acting CEO of MPOCC, the negative perception from Europe on palm oil exerted a growing demand for Certified Sustainable Palm Oil (CSPO). Therefore, the Malaysian Sustainable Palm Oil (MSPO) scheme was introduced as a new certification with the objective of promoting the image of Malaysian palm oil and transforming the profitable industry into a sustainable green certified industry to silent the noise from Europe. Progress and major achievements of MSPO in accident rates reduction and improved productivity were reported, proving MSPO to be beneficial in long term. Information regarding the MSPO certification was being shared such as the approaches, implementation timeline, available incentives and training opportunity. The speaker urged the palm oil industry to give full commitment towards the implementation of MSPO certification for all planted areas and processing facilities in Malaysia.

Quality and Food Safety for Palm Oil Downstream Sector

According to Mrs. Rosidah Radzian, the Director of Product Development & Advisory Services of MPOB, everyone in the palm oil supply chain is responsible in ensuring the food quality and safety. This issue has been used as a tool for the west to discriminate Malaysia palm oil products, which signifies the importance of food safety monitoring. Besides food quality strategies and policies, MPOB has been working on the codes of practice to ensure safety regulations and sustainability aspects compliance. Mrs. Rosidah emphasised that quality monitoring should start from fruit handling and harvesting. The violation of simple handling practices, process contaminants leakage, and wear and tear of old mills could lead to the degradation in crude palm oil (CPO) quality. The latest challenge involving the processed contaminants 3-MCPDE and GE has posed great threat to the palm oil industry, causing immediate impacts to the palm oil trade such as the “No palm oil” label. Industry members were urged to support MPOB’s efforts and address this challenge in a serious manner. A short-term oil processing approach towards 3-MCPDE reduction was shared based on the outcomes of MPOB’s research. It is targeted that with the collaboration of the industry and government in the industrial trials, a proper concentration level of the process contaminants can be proposed by 2019.

New concept of integrated palm oil complex

Mr. Daniel Ng, Alfa Laval’s Vice President, presented the new concept of an integrated palm oil complex on behalf of Alfa Laval to demonstrate a new view of an efficient, safe and sustainable processing complex in palm oil industry to tackle the challenges in the conventional palm oil facilities by bringing the refinery closer to the mills. The innovative aspects in an integrated palm oil complex explained by Mr Ng were the D3Pro undiluted system, POME evaporation as a sustainable effluent-management solution, and 3-MCPDE and GE reducing efforts such as CPO washing, post refining and dry fractionation. This concept allows the palm oil industry to tackle its latest challenges including process contaminant reduction, palm oil traceability and sustainability. It also provides the opportunity to combine solid waste handling that minimises the smell and land usage. All in all, this concept is a sustainable way forward in the palm oil industry that should be more widely applied as the processing of fruits to food can be achieved within shorter period while assuring its quality.

Investment policies and incentives for palm oil downstream industries in Malaysia

As the representative from MIDA, Mrs. Surayu binti Susah was there to share on the available government grants, policies, incentives and other sources of funding for value added downstream projects in the palm oil industry. Under the Eleventh Malaysia Plan, palm oil was included in the Economic Transformation Programme due to its importance to spur the economic growth. It was highlighted that the government is now looking into high quality investment with involvement of new innovation and knowledge, high value products, and R&D. It is believed that with the information on incentives and investment policies, the palm oil industry players will have more confidence in pursuing value addition in palm oil downstream sector.

Panel discussion

A panel of distinguished speakers in the palm oil industry came together to discuss the issues regarding the palm oil industry in Malaysia. The forum was moderated by Mr. U R Unnithan and the panellists were Ir Qua Kiat Seng, Mrs. Surayu Susah, Mrs. Rosidah Radzian, and Mr. Daniel Ng. The 1-hour long forum highlighted the current issues that may impact the industry in the near future such as process contaminants, overcapacity production by Indonesia, slow investment uptake for downstream projects, and the possible competition between food and fuel in the Biodiesel sector and how these issues can be resolved.



1. Networking session before the commencement of the event
2. Short speech and introduction by the emcee of the day, Mr. Mohan, Regional Business Development Manager South East Asia of IChemE.
3. Opening ceremony by Mr U. R. Unnithan, the chairman of RPOPS and brief introduction regarding the event.
4. Keynote speaker, Datuk Dr. Kalyana presenting a speech titled 'Value Addition in the Palm Oil Downstream Sector'.
5. Sharing about 'Revolution X.0 in the Palm Oil Industry' by Ir. Qua Kiat Seng.
6. Prof. Chan Eng Seng on 'Promoting Industry-University Linkages in Palm Oil Processing'.



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7. 'Sourcing Malaysian Sustainable Palm Oil' by the Acting CEO of MPOCC, Dr. Sanath Kumaran K.
8. The sharing of insight regarding 'Quality and Food Safety for Palm Oil Downstream Sector' by Pn. Rosidah Razlan.
9. Alfa Laval's Vice President, Daniel Ng giving a speech about 'Alfa Laval's New Concept of Integrated Palm Oil Complex'.
10. One of the representatives from the government point of view, Pn. Surayu Binti Susah on 'Investment Policies & Incentives for Palm Oil Downstream Industries in Malaysia'.
11. Exchange of ideas and viewpoints during panel discussion.
12. Group photo comprising all committee members and invited speakers of the event.

Promoting the value of chemical engineers to Malaysia's Minister of Energy

The Institution of Chemical Engineers' (IChemE) Malaysia Board, met with Malaysia's new Minister of Energy, YB Yeo Bee Yin on 23rd August 2018, to promote the value of chemical engineers. Christina Phang, its Chair discussed the competencies of chemical engineers during the visit. She advised the Minister that they are best placed to provide technical expertise on a range of topics; including some of the Ministry's focus areas such as renewable energy, energy efficiency, and reducing the use of plastics with bio-degradable substitutions. The two also discussed how IChemE and its members could contribute to the Ministry's redrafting of the Energy Efficiency Act, with a focus on the potential reduction of electricity generated by coal.

Yeo Bee Yin graduated with a first-class honors degree in chemical engineering at the Universiti Teknologi Petronas, Malaysia, and completed her Master's at the University of Cambridge, UK. She took up the role as Minister of Energy on 2 July 2018, wanting to focus on collaborative working between Ministry's, the public, and industry experts.

In a recent interview with *The Star*, she said: "I want to listen to you. We want to create an environment where businesses can innovate, invest, where projects can become bankable, so we can have a good ecosystem for our renewable energy to grow."

Hong Wai Onn, Honorary Secretary and Chair of POPSIG who was part of the board delegation said, "I am delighted to see a chemical engineer as Energy, Technology, Science, Climate Change and Environment Minister. I am also pleasantly surprised to learn that she grew up in Batu Anam, Segamat where rubber and palm oil estates dominate and she actually lived in a palm oil plantation estate called Gomali Estate. On the energy front given the abundance of oil palm biomass nationwide its potential for power generation is widely acknowledged by the government and industry experts. Chemical engineers are ready to help realize this potential fully"



From left to right: Tharshinye Soomaran, Zainab Kayat, Prof Ir Dr Law Chung Lim, YB Yeo Bee Yin, Ir Dr Christina Phang, Prof Dato' Ir Dr Jeffrey Khor, Ir Hong Wai Onn

Palm Oil at The United Nations

Prime Minister Tun Dr Mahathir Mohamad addressed the UN General Assembly in New York on Friday (Sept 28) for the first time since he re-assumed the premiership following the May 9 general election. Losing none of the outspoken nature that made him famous in his 22-year tenure as the country’s fourth Prime Minister, Dr Mahathir said small countries remained at the mercy of the powerful and repeated his call for reform of the UN.



Voice of Malaysia : Dr Mahathir speaking during the General Debate fo the 73rd session of the General Assembly at the United Nations in New York

Palm oil was mentioned in his speech. It was the only trade commodity mentioned in his whole speech. It encapsulates the trade barriers and discriminatory labels on palm oil. Here is an excerpt from his speech.

“Madam President,

TRADE

On the other hand, in terms of trade, nations are no longer independent. Free trade means no protection by small countries of their infant industries. They must abandon tariff restrictions and open their countries to invasion by products of the rich and the powerful. Yet the simple products of the poor are subjected to clever barriers so that they cannot penetrate the market of the rich. Malaysian palm oil is labelled as dangerous to health and the estates are destroying the habitat of animals. Food products of the rich declare that they are palm oil free. Now palm diesel are condemned because they are decimating virgin jungles. These caring people forget that their boycott is depriving hundreds of thousands of people from jobs and a decent life.

We in Malaysia care for the environment. Some 48% of our country remains virgin jungle. Can our detractors claim the same for their own countries?

Madam President,

Malaysia is committed to sustainable development. We have taken steps, for example in improving production methods to ensure that our palm oil production is sustainable. By December 2019, the Malaysian Sustainable Palm Oil (MSPO) standard will become mandatory. This will ensure that every drop of palm oil produced in Malaysia will be certified sustainable by 2020.”

Ir Qua Kiat Seng, founder of POPSIG, pointed out, “Given his stature as the world’s oldest premier and impressive political comeback I have no doubt his speech would have stood out from the non-stop speeches by 193 leaders at the UN General Assembly. Malaysia really needs global attention for the palm oil industry.”

Mr U R Unnithan, President of the Malaysian Biodiesel Association and Distinguished Toastmaster added, “A very well written speech. It was delivered eloquently. It takes the calibre of a true statesman like Dr. Mahathir to take this stand on the global stage. Hats off to him.”

Q4 Diary of Events

Evening Talk : **Revolution X.0 in Palm Oil Industry**

Speaker : Ir. Qua Kiat Seng FIChemE

Date : 13 November 2018

Time : 18:00 - 20:30 (GMT+8)

Location : Faculty of Engineering, Block A, Makmal Komputer Umum 1 (Left of ground floor Foyer), Universiti Malaysia Sabah, Sabah, Malaysia.

Evening Talk : **Integrated Anaerobic-Aerobic Bioreactor (IAAB) for Palm Oil Mill Effluent (POME) Treatment**

Speaker : Professor Ir. Dr. Denny K. S. Ng

Date : 26 November 2018

Time : 18:00 - 20:30 (GMT+8)

Location : Seminar Room 6-2-14, Monash University Malaysia, Subang Jaya, Selangor, Malaysia.

For further information about POPSIG including how to join our events please contact the Secretary Assoc. Prof. Dr Wu Ta Yeong at wu.ta.yeong@monash.edu

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