

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

# POPSIG

IChemE

## Cover Story

**15** IChemE Malaysia Award 2016

## In the News

**2** Message from Editor

**5** An Introduction to The Palm Oil Industry

**6** The Biomass Complex in Palm Oil Industry

**7** Passionately Creative

**8** Palm Oil Olein Yield Improvement with Lean Six Sigma

**9** UK-Malaysia Researcher Links Workshop

**10** RSPO EU Roundtable

**11** Oleochemicals Outlook

**12** Sustainable Actions for Engineers

**14** Sustainable Palm Oil on the Double

**16** An Adventurous Outing

**17** Revolution of Enzymatic Technology in Palm Oil Industry

**18** IChemE Policy Position on Palm Oil Production

**19** Nurturing Future Palm Oil Industry Chemical Engineers

POPSIG gratefully acknowledges the following sponsors:



**Monash University Malaysia,**  
for provision of venue facilities and  
refreshment



**Desmet Ballestra Malaysia,**  
for sponsoring quarterly newsletter



**The University of Nottingham,**  
for provision of venue facilities

## Editor's Message

This special bumper issue celebrates the 10<sup>th</sup> anniversary of IChemE in Malaysia and the remarkable achievements over a very short time. It also marks the first anniversary of POPSIG, the very first Malaysian based Special Interest Group of IChemE. After the pilot phase, in 2017 it will become a full fledged SIG. As you renew your subscription for 2017 you can now tick POPSIG as an SIG you want to be a member of. 2017 is also a very special year for the Malaysian palm oil industry – it marks its centenary. The first commercial scale plantation in Malaysia was founded in 1917 and established in Tennamaran Estate in Selangor.

The Malaysia Awards 2016 will see four finalists vying for the Palm Oil Industry Award. We wish them the very best. In 2015 the Palm Oil Industry Award made its first appearance and it was won by Mr Toh Seong Hing representing Sime Darby Plantation Sdn Bhd. He gave a talk earlier on his submission in July this year and you can read about it inside this newsletter.

Whenever palm oil is mentioned inevitably the issue of sustainability will crop up. Many people relate this to haze as this is symptomatic of the issues. The peatsmog haze of 2015 was one of the most severe and longest in the 19 year history of haze. Whilst putting haze into perspective POPSIG had advocated a number of measures. One of these is government intervention and we are pleased to see this happening as in 2017 almost everyone has forgotten about haze.

In April this year POPSIG helped IChemE draft its policy position on palm oil production and you can view it at page 18 or here <http://www.icheme.org/~media/Documents/icheme/Media%20centre/Policy%20position%20statements/Policy%20position%20-%20palm%20oil%20production.pdf>

POPSIG supports sustainability platforms like RSPO and in this newsletter you can read about how chemical engineers can play a role in sustainability in the palm oil industry. Much of the work chemical engineers do is invisible. Yet when you sit down and think about it we are responsible for many of the comforts we enjoy on a daily basis.

POPSIG received a letter to the editor from a UK member which we publish here together with our reply. Our response will give you an idea of how we are approaching the sustainability issue.

When POPSIG held its first webinar introducing the palm oil industry it literally went global with participants from 22 countries. That is also how pervasive palm oil is in our lives. Not surprisingly sustainability was the theme behind many of the questions.

We look forward to your continued support as we continue to bring you quality events to attend and network.

We hope you enjoy reading these and the full selection of articles in this issues. Follow us on [Facebook](#) and [LinkedIn](#). You can also email us, [ATan@icheme.org](mailto:ATan@icheme.org) directly with your thoughts and critique.

Editor

**Hong Wai Onn**

## Response to Email Received from Member, FIChemE on 12 April 2016

**From:** Member in the UK  
**Sent:** Tuesday, 12 April, 2016 3:31 PM  
**To:** Avanna Tan  
**Subject:** POPSIG

Dear Avanna,

Like so many others now, my family is taking an increasing interest in the source of our palm oil, so I am naturally also interested in the POPSIG.

Can you confirm though please that POPSIG and IChemE only support certified sustainable palm oil production and actively promote moving the industry away from damaging and unsustainable forms of palm oil production. I would be very interested to learn more please about how POPSIG is active in this area

Kind regards,

Member

FIChemE

-----  
 Dear Mr Member,

Thank you for your email and your interest in POPSIG. I am one of the founding members of POPSIG that was launched in August last year with a view of sharing best practices in the processing of palm oil. The supply chain is long starting with the plantation, the mills, the refineries, oleochemicals, end consumer manufacturer before ending up at the supermarket. Best practices in the processing of palm oil encompasses improving yields, energy efficiency, waste reduction, process innovations, process safety etc in short, sustainability. Sustainable manufacturing justifiably requires sustainable raw materials and right from the start POPSIG has strongly and consistently urged for the use of certified sustainable palm oil. The greater the uptake of certified sustainable palm oil, the greater is the encouragement for the upstream plantations and small holders to be sustainable.

The activities of POPSIG are aligned to 'IChemE policy position on palm oil production' <https://www.icheme.org/~media/>

[Documents/icheme/Media%20centre/Policy%20position%20statements/Policy%20position%20-%20palm%20oil%20production.pdf](#) "IChemE believes that chemical engineers play an important role in a current and future sustainable palm oil industry. It is essential high standards of environmental protection, process safety and responsible production are implemented across the sector. IChemE supports the practice of certification of palm oil from the plantation through to final consumer products."

In the palm oil industry in Malaysia most chemical engineers are employed in the oleochemical industry where all players are members of RSPO (Roundtable on Sustainable Palm Oil) and supply chain certified by RSPO. Many players from the refineries and mills are also similarly certified. Mills hardly employ chemical engineers and they are not to be found in the plantations. However POPSIG is not limited to chemical engineers and by inviting non-chemical engineers to join POPSIG we want to see best practices from downstream refineries and oleochemicals move upstream.

On Friday 30<sup>th</sup> April 2016 POPSIG committee members spoke to a very senior chemical engineer in the palm oil industry and he had extensive upstream experience. He told us that oil palm trees need water and if fed sufficient water yields of Fresh Fruit Bunches can increase from 20 to 30 tonnes per hectare. So we are looking at irrigation where chemical engineers can come in as flow experts. Traditionally planters think that rain is the only source of water and currently we are suffering from lack of rain due to El Niño. With increased yield less land is needed.

*continued on page 4*

*continued from page 3*

To put the issues surrounding the sustainability of palm oil into perspective I would like to quote Sir Jonathan Porritt from his blog <http://www.jonathonporritt.com/> Porritt is the co-chairman of the Steering Committee for the High Carbon Stock (HCS).

“On 15/12/15 he wrote

1. Palm oil is a versatile, relatively inexpensive vegetable oil used in tens of thousands of products all around the world. Demand for vegetable oils is growing by around 5% per annum.

2. It’s better to meet that demand with sustainably produced palm oil than with any of its competitors (sunflower, rape seed or soybean oil), simply because far fewer hectares of oil palm are needed to produce the same volume of oil.

3. The massive growth in oil palm development over the last 40 years or so has generated significant economic benefits – both for nation states and for local communities. But this has come at a considerable price – in terms of environmental damage, forest loss, and negative impacts on some communities and indigenous people.

4. Since the establishment of the Roundtable on Sustainable Palm Oil (RSPO) in 2004, the industry has been seeking to address those issues – and substantial progress has been made since then. 20% of all palm oil traded globally is now certified as sustainable by the RSPO.

5. But the industry remains controversial – primarily because of the threat that new oil palm development poses to forests in Indonesia, as well as in a number of countries in Africa and South America.”

Oil palm was introduced into Malaysia in 1917 on a commercial scale so we are approaching our centenary. Malaysia had a head start and also a head start in dealing with sustainability issues. POPSIG started in Malaysia and we hope to take it to Indonesia & other producing countries and to the rest of the world where the consumers are. Although POPSIG had discussions with RSPO we should stress that we support any sensible sustainable platform.

Please go through our newsletters to read more about how we promote sustainability of palm oil production. In a few days, on 11 May I will be running a webinar “Introduction to

the Palm Oil Industry” which is targeted at undergraduates, early career chemical engineers and anyone interested to learn about the industry. If you are interested let us know and we can sign you up.

We look forward to your comments and support.

Kind regards,

Qua Kiat Seng CEng FIChemE



-----

# An Introduction to The Palm Oil Industry

This first POPSIG webinar was broadcast at 4pm Malaysian time on Wednesday 11<sup>th</sup> May 2016. It attracted over 100 attendees from 22 countries viz Kazakhstan, Malaysia, UK, Yemen, Nigeria, South Africa, Hungary, Australia, Mauritius, Indonesia, Myanmar, USA, Poland, Thailand, New Zealand, Ireland, UAE, India, Hong Kong, Pakistan & Singapore. This was a good global mix from palm oil producing and consuming countries.

The chair of POPSIG, Ir Hong Wai Hong, introduced the presenter, Ir K S Qua. Qua has 32 years direct operational experience in the palm oil industry. He started his presentation with a map of the world showing Indonesia and Malaysia produce 86% of the world's palm oil and the top importers are India, China and the EU. He likened the supply chain to the oil & gas industry with plantations & small holdings and mills being upstream, the refineries being midstream and the oleochemicals and end consumer manufacturers being downstream. After sharing other key data he went on to describe the unit operations in the mills, refineries and oleochemical manufacturers.

In the interactive part he asked attendees to name edible palm oil products, oleochemical products as well as key players in the palm oil industry. The audience comprising chemical engineering undergraduates, early career engineers and those keen to know about palm oil, appeared to be well informed and pleasantly surprised Qua by naming accreditation and certification bodies as a key player. This reflects the current emphasis on quality management as well sustainability.

Qua told the audience that there were plenty of opportunities in the palm oil industry to obtain work experience ie professional formation to become a chartered chemical engineer. He used the IChemE Competence & Commitment report template to provide comprehensive examples of these in the palm oil industry. In fact, in the mills, increasing the presence of chemical engineers could bring tremendous benefits as they apply their skills in process engineering.

There were many questions and in view of the time constraint of an hour, Hong chose to ask Qua just two questions viz can any other vegetable oil be made into as many products as palm oil and to describe briefly the environmental and process

safety issues in palm oil processing. POPSIG will try to answer all the questions and post the answers to the key ones in our POPSIG quarterly newsletter.

Some audience feedback were

- The webinar was very useful to understand the high level Palm Oil industry and the presenter was very clearly spoken. Something I was not very familiar with. The content detail however was a bit less than I was anticipating.
- I really liked the interactive element of the presentation, nicely spaced and kept the audience alert.
- Fantastic presentation - Knowledgeable, articulate and very informative. Great advice regarding chemical engineering in general in terms of approach and application. Thank you.
- Sustainability could receive more focus or a dedicated session in future.

POPSIG intends to repeat the webinar on an annual basis and we will certainly take all the feedback into consideration.



Qua broadcasting the webinar from his home office

# The Biomass Complex in Palm Oil Industry

**P**OPSIG evening talk on Monday 23<sup>rd</sup> May 2016 at Monash University Malaysia was attended by about 35 participants with new faces from the academia. The speaker was Prof. Dr Denny KS Ng from The University of Nottingham, Malaysia Campus. Prof. Dr. Denny Ng who is a Chartered Member of IChemE spoke on “The Biomass Complex in Palm Oil Industry”.

Dr Denny first shared his view on the challenge to manage palm-based biomass (e.g., palm kernel shell, empty fruit bunches, decanter cake, etc.) in palm oil up-stream industry. He also pointed out that most of the palm oil mills are facing challenges in meeting the discharge standard of Palm oil mill effluent (POME) imposed by local authorities. While he acknowledged that there are standalone processes that able to convert palm-based biomass to value added products (e.g., biofuels, biobased chemicals), through thermal, biological and physical conversions, he emphasized the importance to have integrated palm-based biorefinery, converts palm-based biomass feedstocks into a wide range of value added products.

Dr Denny in his presentation also shared the strategies for transformation of conventional palm oil mill into sustainable integrated palm oil mill with palm-based biorefinery.

Dennis Tang, Business Development Manager of Novozymes said, “The presentation is timely for the industry to evaluate the importance of integrated palm-based biorefinery to convert biomass into valuable products.”



**Left:** The speaker, Prof. Dr. Denny Ng.



**Right:** Prof. Dr. Denny Ng interacted closely with the audience .



**Left:** Prof. Dr. Denny Ng in his element.

**Right:** Prof. Dr. Denny Ng Hong keeps the audience enthralled.

**Bottom:** (L to R) Prof Dr Tey Beng Ti, Prof. Dr. Denny Ng & Hong Wai Onn.



# Passionately Creative

**O**n Friday 29<sup>th</sup> April 2016 some members of POPSIG committee paid Tan Sri Datuk Dr. Yusof bin Basiron a visit at his office in Wisma Sawit in Kelana Jaya. Yusof Basiron is currently the CEO of the Malaysia Palm Oil Council (MPOC). His role is to promote Malaysian palm oil and enhance its acceptance through its techno-economic advantages and environmental sustainability. Previously he was the Director-General of the Malaysian Palm Oil Board (MPOB) where he spear headed many important developments in the palm oil industry. He has spent 37 years in the palm oil industry.

A chemical engineer by training he shared with us some of the innovations he has brought about. The first is the continuous sterilizer for fresh fruit bunches (FFB) with many advantages such as a smaller footprint, less machinery and labour, operating at atmospheric pressure with constant steam and power demand and better stability of crude palm oil. The technology has been licenced by MPOB to Modipalm and many such plants (77 world wide) have been installed. There are over 400 mills in Malaysia. The original idea came from the Japanese with their rotating mill but it was technically complicated and felt to be unsuitable to be operated and maintained by Malaysian mill owners. He simplified it with a double roller crusher to split the FFB prior to sterilization.

Yusof Basiron is on the board of Sime Darby where with his background in MPOB he pushed for the Genome Select palms. Here yields can go up to 10 tonnes of oil/ha compared with the normal 4 tonnes. This compares to soya bean yields of 0.4 tonnes. Sime Darby announced this on 25/4/16.

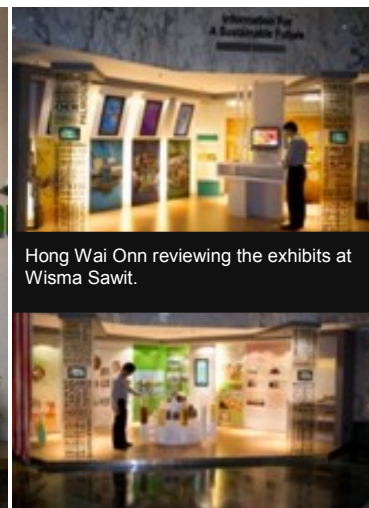
A very hands on person he personally confirmed that oil palm trees needed besides fertilizers, water and yields of FFB can increase from 20 tonnes to 30 tonnes per hectare if fed sufficient water. This will result an additional RM 20 billion in revenue for the nation. He tried this on his own durian plantation and when the water pump could not deliver enough water he opened it up and found stones inside (intake not properly filtered). He found rats biting into the plastic hoses as during the dry season they were looking for water too. This is where chemical engineers can come in as flow experts in irrigation. The presence of chemical engineers in plantations is virtually non-existent. Traditionally planters think that rain is the only source of water.

He has also set his eyes on harvesting where he says mechanization can solve 50 percent of the labour woes Malaysia is experiencing with foreign workers. The challenge in Malaysia is to change the mindset particularly about a pioneer and investing for the future. When he was DG in MPOB he convinced the government to grant him RM 75 million to set up 3 biodiesel plants. By demonstrating the viability of manufacturing many jumped onto the bandwagon. Whether it is economically viable today without mandates is another story.

POPSIG plans to invite him to give an evening talk and inspire chemical engineers to contribute to the palm oil industry.



(L to R) Mohan Balasingam, Tan Sri Datuk Dr Yusof Basiron, Hong Wai Onn and Qua Kiat Seng

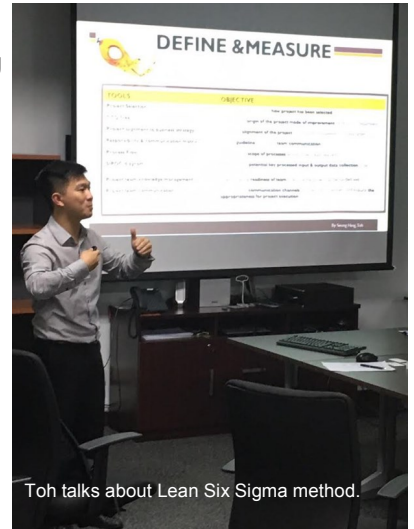


Hong Wai Onn reviewing the exhibits at Wisma Sawit.

# Palm Oil Olein Yield Improvement with Lean Six Sigma Method

**P**OPSIG evening talk on Thursday 28<sup>th</sup> July 2016 at Monash University Malaysia was attended by about 20 participants with. The speaker was Mr. Toh Seong Hing from Sime Darby Plantation Sdn. Bhd. Mr. Toh who was also IChemE Malaysia Palm Oil Industry Award Winner in 2015 spoke on “Palm Oil Olein Yield Improvement with lean Six Sigma Method”. After a concise introduction on the Lean Six Sigma DMAIC methodology, Toh focused on the application of this method and benefits observed in their midstream processes.

Md Saiful, Executive from PORAM said, “Fascinating presentation on the application of Lean Six Sigma to improve palm oil olein yield.”



Toh talks about Lean Six Sigma method.



Thank you Mr Toh for the fascinating and insightful presentation.



Toh keeps the audience enthralled

## Student's Experience in Palm Oil Industry

By Ivan Kim Kwan Choong

**W**hen I first received the offer letter to do my internship with Sime Darby, it was truly an exciting moment yet nervous at the same time cause my knowledge about the oil palm industry wasn't that in-depth yet. Recalling my experience in the first month of my internship, it was rather challenging because the plant's systems are extremely far more complex compared to what we have been exposed to in classes and the unexpected incidents have pushed my critical thinking and crisis management skills beyond one's imagination in order to come up with the best solution.

However, looking things from a more positive perspective, these situations have taught me that teamwork and willingness to learn are really important because without the support and guidance from my fellow colleagues, I don't think I would have been able to get myself through a such a steep learning curve.

The palm oil industry does not only revolve around the agricultural sector but also the energy sector in which students are strongly encouraged to contribute to the palm oil industry as renewable energy has already started to grow its roots in our world .



# UK-Malaysia Researcher Links Workshop

## Kuala Lumpur 30 May-3 June 2016

The University of Nottingham Malaysia Campus (UNMC) hosted the first Researcher Links workshop which was jointly sponsored by British Council and Academy Science Malaysia (ASM) from 30<sup>th</sup> May - 3<sup>rd</sup> June 2016.



**1** Held at Impiana Hotel, Kuala Lumpur, the five-day workshop featured eminent speakers in their respective fields and was targeted at

Malaysian and UK researchers. The oral and poster presentations by both the participants and the invited speakers were very well received. The event also witnessed several potential new research collaborations which will be embarked upon shortly. On top of that, there was great interest in the public engagement session, which alone attracted almost 100 participants.

The highlights of the event included presentations by Ir Thayananthan Balakrishnan (Chairman of IEM Chemical Engineering Technical Division) and Dr Viachaslau Filimonau (senior lecturer at Bournemouth University) at the public engagement session, which was held at UNMC's Kuala Lumpur Teaching Centre (KLTC) in Chulan Tower. Both speakers shared their insights on the latest issues related to biofuel and sustainability. Another interesting session was on science communication. During this session, Ms Tan Shiew Chin, the assistant editor of The Star (features central: health (Fit for life) / reads / entertainment) provided useful insights on writing for mass media. The session was enlightening for all participants, who were more used to writing for a scientific audience, such as for journal papers and conference proceedings, rather than writing for layman readers and for being published in the newspaper.

This event was jointly organized by Centre of Hydrogen Energy (IFE), Universiti Teknologi

Malaysia together with Centre for Environmental Strategy (CES), University of Surrey, UK and Centre of Sustainable Palm Oil Research (CESPOR), and UNMC.

The workshop was fully funded by the British Council and ASM under the Newton Researcher Links Workshop Fund. A total of 40 participants, consisting of 20 from the UK and another 20 from Malaysia, were selected following a strict screening process. The majority were those under 40 (early career phase), with some exceptions given to more experienced participants which were very much interested and fully committed to join this week-long workshop.

Hong, chair of POPSIG, was also invited as Guest Speaker to deliver his speech on "Palm Oil Processing - Roles Towards a Sustainable Bioeconomy".

Aside from the technical sessions, there was also experiential and on-site learning, as well as networking and socialising during outdoor activities and dinner events. On the last day, they made an excursion to an integrated biomass and biogas plant as well as CESPOR in Palong, Negeri Sembilan. The participants not only had a chance to see the biogas plant themselves, but were also able to experience touring into oil palm plantation and biomass processing facilities (e.g. biofertiliser, dried long fibre, etc.) within the vicinity of the plant area.



**1:** Officiating the workshop by Emeritus Professor Dato' Dr Mohamed Mahyuddin Mohd Dahan FASc, Honorary Treasurer of the Academy of Sciences Malaysia (ASM) together with Prof Denny Ng and Prof Richard Murphy.

**2:** Hong talks about roles of palm oil processing towards sustainable bioeconomy.

**3:** Prior to pilot plant visit, Prof. Chong explains the Integrated Anaerobic Aerobic Bioreactor, a novel technology proven to improve palm oil mill effluent treatment efficiency.

## RSPO EU Roundtable Milan, Italy 6 June 2016

Trust and transparency are key to transforming the global palm oil market and RSPO certification is an essential tool for enabling companies to implement their sustainability and climate change commitments. This was the main message heard at the Roundtable on Sustainable Palm Oil's (RSPO) fourth European Roundtable event, "100% Certified Sustainable Palm Oil by 2020: A Climate Change Imperative", attended by some 300 government representatives, NGOs, retailers, food manufacturers, investors, academics, and oil growers and traders.

Governments also have a role to play. Paolo de Castro, Member of the European Parliament Committee on Agriculture, explained that palm oil's sustainability is also on the EU agenda: "Discussions are ongoing both in the European Parliament and the European Commission about the most appropriate response to this issue at the EU level. CSPO represents a great opportunity to lead the market transformation. With everyone's support we need to do our best to consolidate all efforts of EU member states and industries to increase the uptake of CSPO and create a European commitment."

The EU imported some 6,700,000 tonnes of palm oil in 2015, making it the 2nd largest import market after India. Europe is home to some of the world's largest companies and brands and consumers increasingly are demanding sustainable palm oil. Achieving 100% market uptake in Europe will incentivise more palm oil producers and smallholders to become RSPO certified sustainable.

Fresh RSPO data, presented at the conference, show that of 2.8 million tonnes of RSPO certified palm oil sold in 2015, an estimated 1.9 million tonnes were shipped to Europe.

K S Qua was there and when he met up with RSPO's Head of Certification, Jan Van Driel, he invited Jan to speak at POPSIG evening on Monday 19<sup>th</sup> September 2016. Jan who is a chemical engineer will talk on sustainability and the role chemical engineers can play.



1: Ferrero used 100% SG in 2015 and in 2016 100% is traceable to plantations.



2: K S Qua with Jan Van Driel, RSPO's Head of Certification.

# Oleochemicals Outlook Bali, Indonesia, 23-24 August 2016

## Is **RSPO** Sustainable?

This was the question to which AOMG Advisor, Ir Qua Kiat Seng, offered some answers at the 4<sup>th</sup> Oleochemicals Outlook in Bali, Indonesia from 23 – 24 August 2016.

Whilst the production and offtake of RSPO certified palm oil has increased rapidly in the last few years, Qua examined some numbers and argued that for the momentum to continue RSPO needs to work harder as well modify its operating model. Physical transition for oleochemicals has been in place for just 3 years. AOMG members are SCCS certified and can supply MB and SG products. They report a very low uptake.

As peatsmog haze is on the minds of many in Singapore, Malaysia and Indonesia Qua touched on this. Another issue is costs and Qua also investigated this. He explained the latest development, RSPO Next.



Qua talks about RSPO and oleochemicals.



Participants at the event.



Qua chairing one of the sessions.



A presentation by Sime Darby.

### What is the **RSPO**?

Roundtable on Sustainable Palm Oil (RSPO) is a not-for-profit that unites stakeholders from the 7 sectors of the palm oil industry: oil palm producers, processors or traders, consumer goods manufacturers, retailers, banks/ investors, and environmental and social non-governmental organisations (NGOs), to develop and implement global standards for sustainable palm oil.

Source: <http://www.rspo.org/about>

# Sustainable Actions for Engineers

The POPSIG evening talk on Monday 19<sup>th</sup> September 2016 at Monash University Malaysia was attended by about 50 participants. The speaker was Jan Van Driel, Head of Certification at RSPO (Roundtable on Sustainable Palm Oil). He is a chemical engineer who graduated from Delft Technical University in The Netherlands and has long colourful professional history in palm oil industry. Upon graduation he joined Unilever where he worked in many countries for many years, then Golden Hope which later became Sime Darby. Although the title of his talk was “Ten years of RSPO sustainable oil palms” much of his talk focussed on the role that chemical engineers can play in sustainability in the palm oil industry.

Van Driel gave a clear picture of RSPO to the audience. In sharing his industry experience he kindly described the milling sector as mature. Whilst further downstream in refining and oleochemicals everything was kept safely in pipes and vessels, the mill operations are highly visible. In Latin America boilers in mills are powerhouses and he could not see anything emitting from the chimneys.



An attentive audience



Jan Van Driel, RSPO Head of Certification



Taking notes



Eng Tian Sin of Parsec Engineering

Van Driel's talk drew many questions from the audience. To one he answered that in the plantation and mill certification by RSPO improved yields by 5 to 15%. To another the presence of NGOs in RSPO membership and absence of politicians ensured balance and high standards. He also provided an insight into how RSPO ensured long-term sustainability for small holders.



- 1: An appreciative audience.
- 2. Dr Tey Beng Ti and Dr Nagasundara Ramanan form Monash University Malaysia.
- 3. B P Chow asking a question.
- 4. (L to R) Prof Aziz Raman, Jan Van Driel & Hong Wai Onn (POPSIG chair).

Professor Ir. Dr. Abdul Aziz Bin Abdul Raman, chair of IChemE in Malaysia said, “Jan Van Driel made the audience feel that the “oils & fats” industry is equally important and as “romantic” as the oil & gas industry. The talk opened our eyes to the roles that chemical engineers can play in the overall supply chain of palm based products. He made us aware that palm oil can be a higher order sustainable, clean and safe industry. The commitment from POPSIG Committee in organising the talk and getting a high profile speaker from RSPO is highly commended. POPSIG has made IChemE Malaysia’s commitment towards palm oil industry very visible. I truly enjoyed the talk and look forward to the next.”

Dr Nagasundara Ramanan, Senior Lecturer in chemical engineering at MUM said, “The event covers the broad overview of what RSPO does and where are they operating. The interesting part is how a chemical engineer plays a role to be a part of the process. This could be extended to the student chapter where they would get inspired to be a part of the global sustainability of the palm oil industry.”

The next evening talk on 9th November 2016 at the same venue will be “Supply Chain Management and Logistics Issues for Palm Oil Industries by Assc. Prof. DDr. Lam Hong Loong from the University of Nottingham Malaysia Campus.

# Sustainable Palm Oil on the **Double**

**R**esearchers in Austria say that the land used for palm oil production could be doubled without further damage to sensitive environments like tropical forests.

Palm oil is the world's most common vegetable oil, accounting for 30% of global vegetable oil use. It is used for frying, in baked and processed foods, in consumer products such as detergents, and for biodiesel. The oilseeds have a very high yield and the oil is cheap. Demand for palm oil continues to rise, and it has been important socially and economically, lifting millions of small-scale farmers out of poverty.

The team at the International Institute for Applied Systems Analysis (IIASA), led by Johannes Pirker, conducted the first study to map suitable land for palm production on a global scale, taking into consideration temperature, rainfall, slope and soil type, as well as environmental issues.

The researchers used a map previously compiled by IIASA and the International Food Policy Research Institute (IFPRI) from satellite data, data from other institutions, and information from local volunteers. They found that almost 1.37bn ha of land across tropical regions of Africa, Central and South America and Asia, would theoretically be suitable for growing oil palms. The team then discounted land already being used for other purposes, including farming and habitation, land protected by law, and land valuable from a biodiversity or carbon storage potential. This left an area of 19.3m ha of suitable land. Currently, there are around 18.1m ha of oil palm cultivation.

Between 1990 and 2010, the area of land covered by palm oil plantations grew from 6m ha to 16m ha, an area the size of Uruguay. Much of this, however, came at the expense of environmentally-important tropical forests and peatland, particularly in Malaysia and Indonesia, which produce 80% of the world's palm oil. This has made palm oil somewhat controversial from an environmental perspective, and finding ways and areas to grow it sustainably is likely to be welcomed.

"There is room to expand palm oil production and to do it in a sustainable way," concluded Pirker. The researchers caution, however, that using some of the land may be difficult. Around half of the land they identified is more than ten hours' drive to a city.

Mr. BP Chow, past chair of IChemE in Malaysia responded, "Most people are not aware that Plantation areas on peat is not that significant in Peninsula Malaysia. Though there are peatland in Malaysia, most of the peat is located in Sarawak.

The first planters in Sarawak made some serious mistakes by planting in areas with peat, especially around the Pulau Buit where the peat soil was reported to be more than 50m. They are now recognizing the high costs of infrastructure maintenance as well as poor yields from such soil. That is why experienced Planters would tell you to avoid deep peat.

In any case, the Oil Palm Plantation in Sarawak is relatively small compared to the total land area planted in Malaysia.

At least this article did recognize the fact that this industry is important to uplift poverty for millions of small farmers in SE Asia. For those of you who have seen how the Oil palm Plantation had transformed areas such as Keratong, Jengka, Sahabat in Sabah and many other places throughout Malaysia, you can see that with the opening up of the land, the locals would be employed and the cash economy expands rapidly. Without the oil palm plantation, these people would not be able to earn much and there would not be even small repair shops, small retails, etc. Places like Kluang, Banting and Teluk Intan had benefited tremendously from the Oil Palm growth.

I have seen this transformation first hand. That is why I do feel quite strongly that we need to bring this message out. We cannot expect handouts but that we are developing the use of the land responsibly in our own local ways. As mentioned, Nature provides its own check and balance - that peat soil with poor harvest and high infrastructure costs had deter most experienced planters to avoid it. Of course, there would always be those who would not believe this. We just have to keep trying and tell our version."

Source: *The Chemical Engineer* September 2016 Issue 903

## IChemE Malaysia Award 2016

The IChemE Malaysia Awards celebrate excellence, innovation and achievement in the chemical and process industries.

There are eight categories available to enter at the IChemE Malaysia Awards, including one category unique to Malaysia - the Palm Oil Industry Award. This award is to recognize the best project implemented and demonstrates innovation, successful delivery and a technical, commercial, safety and/or environmental benefit. The project may relate to new industrial plant or to the enhancement of existing palm oil mills, refining and other related industries.

Mr Toh Seong Hing from Sime Darby Plantation Sdn Bhd was the award winner in 2015. The finalists for this year award are:

- Continuous dry fractionation for palm oil – Desmett Ballestra (M) Sdn. Bhd.
- Continuous fractionation of palm oil – Sime Darby Plantation Sdn. Bhd.
- Re-engineering current palm oil degumming process – Sime Darby Research Sdn. Bhd.
- Organic coagulant for WWTP – Sime Darby Research Sdn. Bhd.

This year's IChemE Malaysia Awards are being held on 24 October 2016. Please stay tuned with us for 2016 Palm Oil Industry Award winner updates!



## National Chemical Engineering Symposium 2016

National Chemical Engineering Symposium (NACES) is an annual, national-levelled event organized by Chemical Engineering Student Society of universities in Malaysia, in collaboration with Chemical Engineering Departments of all respected universities in Malaysia and Institution of Chemical Engineers (IChemE) of Malaysia. NACES is hosted every year by public or private universities in Malaysia which offer Chemical Engineering Programme through application.

This year, NACES with the theme 'X-Solution: Food-Water-Energy Nexus' was held at the University of Nottingham, Malaysia Campus (UNMC) from 9th - 11th November. This event was organized by UNMC's Institution of Chemical Engineers (IChemE) Student Chapter and supported by the university's Department of Chemical and Environmental Engineering and IChemE Malaysia.

Robert Bruce, chair of SONG in Malaysia, and Hong, chair of POPSIG, were invited as Keynote Speaker at NACES 2016.



Officiating the symposium by Alexandra Lee (second left), Prof. Denny Ng, Rover Bruce and Prof. Law Chung Lim.



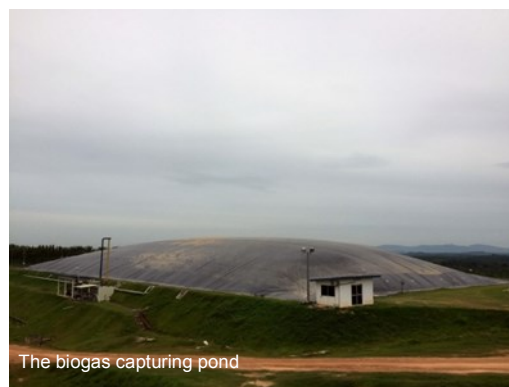
Robert Bruce gives keynote speech



Hong gives keynote speech

The chemical engineering undergraduates from Monash University Malaysia visited the Ulu Kanchong Palm Oil Mill (UKOM) and saw, smelt, heard and felt a real palm oil mill. This mill is self-sufficient in terms of energy requirements due to the availability of adequate quantities of biomass such as mesocarp fibre and shell that are used as solid fuel in the steam boiler.

The mill has fruit reception, sterilization station, threshing station, digestion and pressing station, clarification station, kernel recovery station, power station and the revolutionary effluent treatment plant – biogas plant. The undergraduates were impressed with the mill cleanliness, albeit it is old (38 years). The mill manager Mr Tan Yaw Cho is a chemical engineer and has been heading this mill for 35 years. He has implemented many process improvements which he proudly showed us. These include improved steam boiler fuel feeding system, biogas (from palm oil mill effluent) harvesting for electricity generation and so on.



The biogas capturing pond

Elishia Willeams Peter said to Mr Tan, “I’m very excited to venture into palm oil industry. I want to work in this palm oil mill!” You should see the big smile on the faces of Hong and Qua as it made the day for these POPSIG committee members.

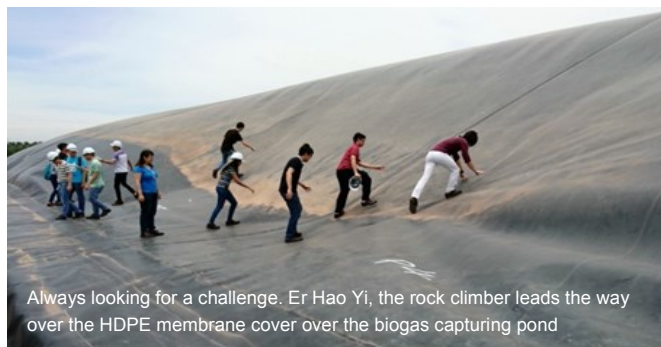


Viewing all the products of the many unit operations

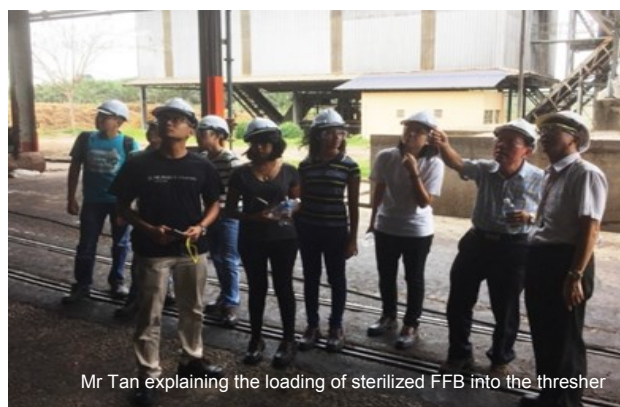


Mr Tan Yaw Cho enthusiastically briefing the budding chemical engineers

## An adventurous outing



Always looking for a challenge. Er Hao Yi, the rock climber leads the way over the HDPE membrane cover over the biogas capturing pond



Mr Tan explaining the loading of sterilized FFB into the thresher



Alison Tan Sue Tsiem and classmates, returning, happy with the expedition



Group photo with the staff of UKOM



# Revolution of Enzymatic Technologies in Palm Oil Industry

ChemE Biochemical Engineering SIG (BESIG) and Palm Oil Processing SIG (POPSIG) first jointly organized evening talk was held at the Monash University Malaysia in Bandar Sunway on 5th October 2016. It was attended by more than 120 participants. Ir. Hong Wai Onn from Novozymes Malaysia and also the chair of POPSIG, spoke on the Revolution of Enzymatic Technologies in Palm Oil Industry.

After a concise introduction on the application of enzymes in general industrial processes e.g. household care and oil & fats, Hong focused on the newly invented enzymatic technologies for palm oil milling and biodiesel production.

Enzymes, a biological catalyst in the form of proteins, will loosen palm fruit mesocarp oil bearing cell and reduce mass viscosity in the palm oil milling process. A significant amount of previously unextractable oil can be recovered at lower operating temperatures. This bio-innovation enables the milling process to operate in a more sustainable manner by using substantially less water, up to 80%. The result is also less POME (palm oil mill effluent). In biodiesel production, enzymatic technology provides feedstock flexibility enabling producers to use all types of feedstock, either low or high in free fatty acids for biodiesel production. Furthermore, it also offers mild and safer process conditions and lower energy consumption is expected due to lower methanol rectification costs as well as eliminating the usage of the catalyst sodium methoxide, a dangerously caustic base.

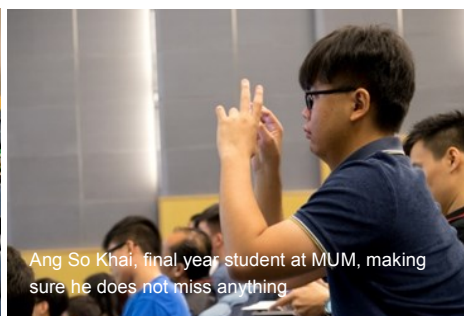
As you will see from the pictures Hong is a prolific and engaging speaker who keep the audience on board throughout.



Nagasundara Ramanan, chair of BESIG in Malaysia and Hong, chair of POPSIG



Hong keeps the audience enthralled



Ang So Khai, final year student at MUM, making sure he does not miss anything



C M Balam, Senior Lecturer at MUM said, "Very informative presentation by speaker. Lively and very interactive. Great platform for knowledge sharing."



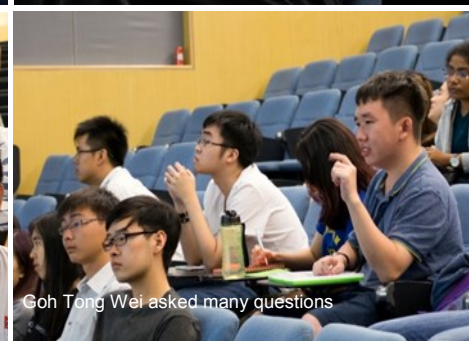
Shiva Narayan, Director at E World Holdings "A great insight was given into using enzyme as a substitute catalyst for glyceride exchange."



Parveenjit Kaur, year 3 student "An insightful talk on current enzymatic technology in the palm oil milling process."



Dr Kor Yann Yae (Jeff) Project Manager at MY Continent with Prof Dr Tey Beng Ti of MUM



Goh Tong Wei asked many questions



During the talk Hong took a record number of questions. He was not spared even after the talk



We enjoyed your talk very much, thank you Mr Hong"

## Policy position: palm oil production

Palm oil is a widely used raw material and is found in many products from food, cosmetics and pharmaceuticals to biofuels, it has many applications. The high yield of palm oil per hectare, relatively low cost and versatility in use are attractive; it accounts for over 30% of global oil and fat production.<sup>1</sup> In 2015, around 85% of global palm oil was produced in Indonesia and Malaysia.<sup>2</sup> This has supported economic development in this region.

In recent years there has been considerable concern regarding the sustainability aspects of the palm oil industry. The growth in palm oil production has led to deforestation, loss of habitats, negative impacts on rural and indigenous communities and air and water pollution. International concern about the sustainability of this industry has led to the establishment of different groups, including the Roundtable for Sustainable Palm Oil (RSPO).<sup>3</sup> Many companies that use palm oil in their products have made commitments to either reduce their consumption of palm oil or ensure that it comes from sustainable sources.

Upstream palm oil production (agriculture and mills) employ few, if any, chemical engineers. However, many chemical engineers work in downstream refining and industries such as oleochemicals. The chemical engineering skillset can be applied in both upstream and downstream areas. This can influence good practice and improve sustainability through improved yield, energy efficiency, waste reduction, effluent treatment and reduction in water, land and air pollution.

IChemE believes that chemical engineers play an important role in a current and future sustainable palm oil industry. It is essential high standards of environmental protection, process safety and responsible production are implemented across the sector. IChemE supports the practice of certification of palm oil from the plantation through to final consumer products.

The principles that are the foundation to a sustainable industry are essential components of IChemE accredited undergraduate courses and the ethics and integrity of professional, Chartered Chemical engineers.

IChemE serves as an advocate for the profession; engaging with the public and policy- and decision-makers to inform on the issues and where chemical engineers can inform on good practice and provide realistic, tangible solutions.

Through the network of technical special interest groups, IChemE will continue to share knowledge and experience relevant to the industry and champion good practice. This includes improvements in process technology, process safety and working to certified standards. Case studies for water effluent treatment and biogas as examples of valuable contributions.

IChemE calls on all chemical engineers and employers that are involved in the supply chain and consumer industries to work to the highest standards of safety and efficiency.

IChemE will work with members to articulate the positive contribution that the discipline makes and how chemical engineering matters to the future of this industry and the wellbeing of all the people that are connected with it, from farmers to processors and consumers.

<sup>1</sup> <http://www.palmoilresearch.org/statistics.html> [accessed 28/04/2016]

<sup>2</sup> <http://www.indexmundi.com/agriculture/?commodity=palm-oil> [accessed 28/04/2016]

<sup>3</sup> <http://www.rspo.org>

## Nurturing Future Palm Oil Industry Chemical Engineers

**M**onash University Malaysia 3rd year chemical engineering students visited the Jomalina Refinery as well as Emery Oleochemicals in Telok Panglima Garang on 8th September 2016. This is POPSIG's contribution to nurturing chemical engineers for the palm oil industry and we thank IChemE member Mr Sudershan Sivasubramaniam, Site Operations Director at Emery Oleochemicals for arranging this two in one visit .

He is also assisting with the final year undergraduates with their capstone design project. Their senior lecturer Mr Balaram Nair says, "Let me take this opportunity to thank him and his team for the extremely informative presentation made. An excellent insight into plant operations was provided. Overall a very helpful and productive visit."



## Get Involved in POPSIG

ChemE members are entitled to join one special interest group free of charge, as part of their membership package, and can join additional special interest groups on payment of a small subscription. Please join POPSIG's technical networking community by becoming a member of POPSIG. [Join a special interest group >>](#)

POPSIG's activities are organized by its members. Getting involved can help you and your organization to raise your profile in the palm oil processing sector. Would you be interested in speaking at a POPSIG event in Malaysia, or giving an online presentation to a wider international audience via webinar? Or could your company support IChemE's POPSIG through provision of venue facilities or sponsorship of an event? To discuss opportunities, please contact Avanna Tan, [specialinterestgroups@icheme.org](mailto:specialinterestgroups@icheme.org).

Membership of POPSIG is not only for chemical engineers but for anyone interested can join as an Affiliate member. The presentations are directed towards audiences who would like to know more factual information about Palm Oil Processing industry and who would appreciate an opportunity to ask question. The committee is looking to ensure presentations cover palm oil milling, refinery as well as oleochemical. If you'd like to volunteer to give a presentation – either at a physical seminar or via an [online webinar](#) - then please get in touch, providing some details about yourself and your proposed talk. Contact Professor Dr. Chong Mei Fong, [meifong.chong@nottingham.edu.my](mailto:meifong.chong@nottingham.edu.my), or Avanna Tan, [specialinterestgroups@icheme.org](mailto:specialinterestgroups@icheme.org), today.

### POPSIG Committee

Chair : Hong Wai Onn MIChemE

Secretary : Professor Dr. Chong Mei Fong AMIChemE

Committee : Qua Kiat Seng FIChemE  
Khoo Kiak Kern FIChemE

Chow Boon Ping FIChemE  
Toh Seong Hing AMIChemE

Professor Dr. Robiah Yunus FIChemE  
Liew Sin Lu AMIChemE

IChemE : Mohan Balasingam

Avanna Tan

## IChemE offices

### Global headquarters

UK - Rugby

Tel: +44(0) 1788 578214

Email: [info@icheme.org](mailto:info@icheme.org)

### Australia

Tel: +61(0) 3 9642 4494

Email: [austmembers@icheme.org](mailto:austmembers@icheme.org)

### Malaysia

Tel: +603 2283 1381

Email: [malaysianmembers@icheme.org](mailto:malaysianmembers@icheme.org)

### Singapore

Tel: +65 6471 5043

Email: [singaporemembers@icheme.org](mailto:singaporemembers@icheme.org)

### New Zealand

Tel: +64 (4) 473 4398

Email: [nzmembers@icheme.org](mailto:nzmembers@icheme.org)

### UK - London

Tel: +44 (0) 20 7927 8200

Email: [info@icheme.org](mailto:info@icheme.org)