

First MOSTA-IChemE POPSIG collaboration exceeds expectations

The webinar workshop with the theme Mitigation of 3-MCPDE & GE : Industry Perspective was held on Thursday, 15 October 2020 from 10.00 am to 12.30 pm. There were more than 150 participants.

The banner features the IChemE logo and the following details:
MITIGATION OF 3-MCPDE & GE INDUSTRY PERSPECTIVE
15 October 2020, 10.00am - 12.00pm, 08:19
TOPIC HIGHLIGHTS
• IOI Edible Oils' 3-MCPDE & GE Mitigation Initiatives
• Mitigation of 3-MCPDE & GE Precursor in Palm Oil Mill
• Q&A Session
Moderator: Ir Qua Kiat Seng, Board Member IChemE Malaysia
Speakers: Ir Shyam Lakshmanan, General Manager, IOI Edible Oils Sdn Bhd; Ir Chew Chien Lye @ Mervin, Chief Engineer II, Sime Darby Plantation Research Sdn Bhd
WELCOME ADDRESS: Academician Tan Sri Emeritus Prof Datuk Dr Augustine S.H. Ong, President, MOSTA

Academician Tan Sri Emeritus Prof Datuk Dr Augustine S.H. Ong, President, MOSTA about to deliver his welcoming address.

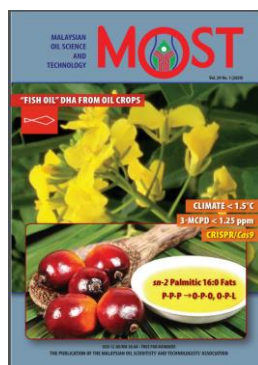
MOSTA (Malaysian Oil Scientists' & Technologists' Association) has, since the topic surfaced in the last decade, been in the forefront seeking answers to the issue of 3-MCPDE (3-MonoChloroPropaneDiol Esters) and GE (Glycidyl Esters).

3-MCPDE is found in processed meats, sauces, gravies, biscuits and most vegetable oil where it is highest in palm oil. 3-MCPDE could pose risks to kidneys and testes and are formed unintentionally during oil refining processes at high temperatures in the presence of chloride ions.

GE are probably genotoxic and carcinogenic and increases during high temperature deodorisation. In both cases diacylglycerol (DAG) present in crude palm oil are precursors.

The European Food Safety Authority (EFSA) has set from 2021 maximum limits for GE at 1 ppm and 3-MCPDE at 1.25 ppm for oils including palm kernel oil and 2.5ppm for other oils including palm oil.

IChemE = Institution of Chemical Engineers



MOSTA's latest effort was published in MOST issue 2020 July Vol 29(1) where its editor Dr Goh Swee Hock has made an excellent summary of the MOSTA Workshop on Mitigation of 3-MCPDE on 19 February 2020.

At the workshop at Universiti Alumni Hall, Desmet Ballestra, Alfa Laval, Lurgi and Novozymes presented while Sumwin Malaysia Solutions made a first appearance at a MOSTA event. Mr. Unnithan presented Sumwin's patented technology to mitigate 3-MCPDE & GE in crude palm oil.

When MOSTA approached POPSIG about the next workshop we decided to invite chemical engineers from the industry to present so that participants can learn what a couple of industry players are doing. We are grateful that Sime Darby Plantations and IOI Edible Oils have come forward.



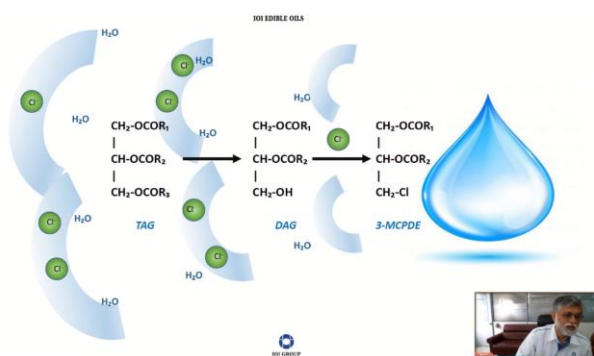
The moderator Ir Qua Kiat Seng, speakers Ir Shyam Lakshmanan and Ir Mervin Chew Chien Lye are chartered chemical engineers and members of POPSIG.

Ir Mervin from Sime Darby Plantations Research Sdn Bhd spoke first. His presentation was titled "Mitigation of 3-MCPDE & GE Precursors in Palm Oil Mill." The mitigation strategies adopted are chloride mitigation and improvement of oil quality to reduce DAG.

POPSIG = Palm Oil Processing Special Interest Group

Chloride mitigation could broadly be through reduction of chloride in crude palm oil (CPO) by CPO washing or CPO dechlorination by the application of sodium metabisulfite. Also reduction of chloride at source can be done by palm fruits cleaning and secondary oil segregation. Palm fruits cleaning is effective and the reason is under investigation.

Oil quality improvement is through the reduction of free fatty acid (ffa). Fruit quality is enhanced by reducing enzymatic action through better fruits handling and management of harvesting interval. Autocatalytic action is reduced during processing by managing the time and moisture content as well as segregation of different oil qualities.



Ir Shyam explored the numerous pathways of 3-MCPDE formation

Ir Shyam presented “IOI Edible Oils’ 3-MCPDE & GE Mitigation Initiative.” Ir Shyam started with a detailed examination of the pathways of 3-MCPDE formation. He then shared the effect of washing to remove chloride in crude palm oil. Organochloride was more difficult to remove than inorganic chloride and Ir Mervin also alluded to organochloride eg. sphingolipid organochloride in his presentation.

As the 3-MCPDE tests took about a day he made correlations between total chloride content in washed PO and 3-MCPDE in RBDPO for his operations to help him manage his processing. He confirms organochloride does matter.

On GE he demonstrated a co-relationship between 3-MCPDE and GE. As GE formation during refining is less at lower temperatures it appears that GE should be removed by a post refining/deodoriation stage to meet RBD colour.

As 3-MCPDE and GE tends to concentrate in olein fraction, it is needed to target lower levels at the refining stage.

Parting thoughts



Ir Shyam's last slide

In conclusion Ir Shyam likened the issue to the current Covid-19 pandemic and urged all sectors in the industry to work together to resolve the issue. Ir Mervin had also earlier concluded with a similar message.



A virtual group photo with the staff at MOSTA office at the end of the webinar workshop

Many questions were received and the Q & A session was over an hour long. Questions that could not fit into the time frame will be done through email.

Feedback from participants was very encouraging

- Excellent presentation
- Very good session and very informative
- It was a good quality webinar
- The papers by the presenters were good, the presenters set out their points clearly and presented well, and the moderator was excellent. Well done MOSTA for organising a webinar of such high quality.

POPSIG looks forward to further collaboration with MOSTA in 2021.