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SOUVENIR

FATS & OILS INTERNATIONAL CONFERENCE & EXHIBITION

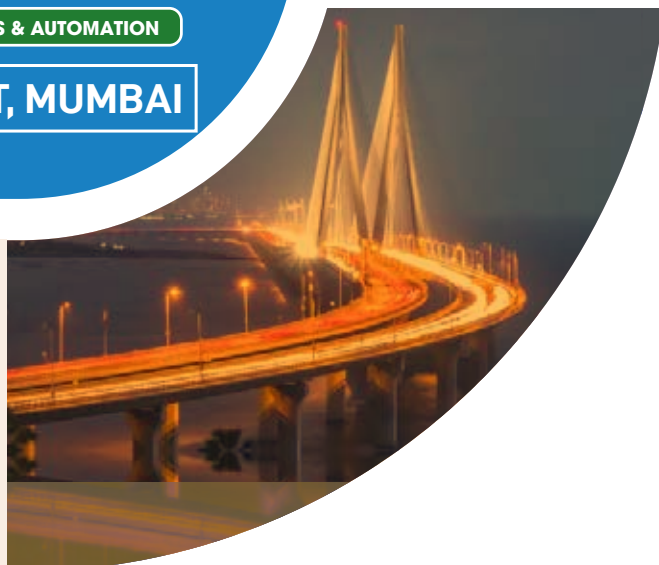
MEETING THE CHALLENGES OF ENERGY EFFICIENT PROCESS INNOVATIONS & AUTOMATION

16TH – 18TH MARCH 2023 | GRAND HYATT, MUMBAI

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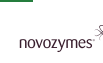
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otaiwz-foic2023.org



DVC PROCESS TECHNOLOGISTS

Technology with Innovation

Practicing Sustainability...

Our process solutions and plants are highly energy efficient and environment friendly. We strongly believe in 'Conserve Energy, Save Environment'.

200+ Global references

70+ Greenfield projects

75+ By products processing plants



We are a single point solution provider, for customers for all their needs regarding design, manufacture and supply of various process technologies along with equipment and turnkey solutions for edible oil refining, oil seeds extraction and other value added processes for by products.

PROCESSING TECHNOLOGY FOR:

- Edible Oil Refinery (for Soybean, sunflower, cotton seed, Rice Bran, mustard / Rapeseed/canola, groundnut, Sesame and Olive Oils etc.
- Solvent Extraction Plant
- Flash Desolventisation
- Gums Drying/ Lecithin plant, Acid Oil Plant and 2 Stage Scrubbing.
- Fat Modification: Fractionation, Hydrogenation and Interesterification.
- Multi-feed Bio-diesel Plant
- Process Automation
- Skid Mounted Plants
- Zero Liquid Discharge Systems



PROCESS IMPROVEMENT SERVICES

- Existing Plant Up gradation and capacity enhancement
- Customized equipment design and supply
- Conduct Technical Audits for process parameters as well as conditions of equipment and instrumentation, and provide efficient solutions
- Critical issue identification and rectification



PRODUCTS

- High-Shear Mixers
- Heat Exchangers
- Filtration Solutions like: PLF, HPLF and Polish Filters
- Scrapped Surface Heat Exchangers
- Reactors with agitation working under pressure or vacuum.
- Tank Farms/ Bulk Storage tanks and its automation



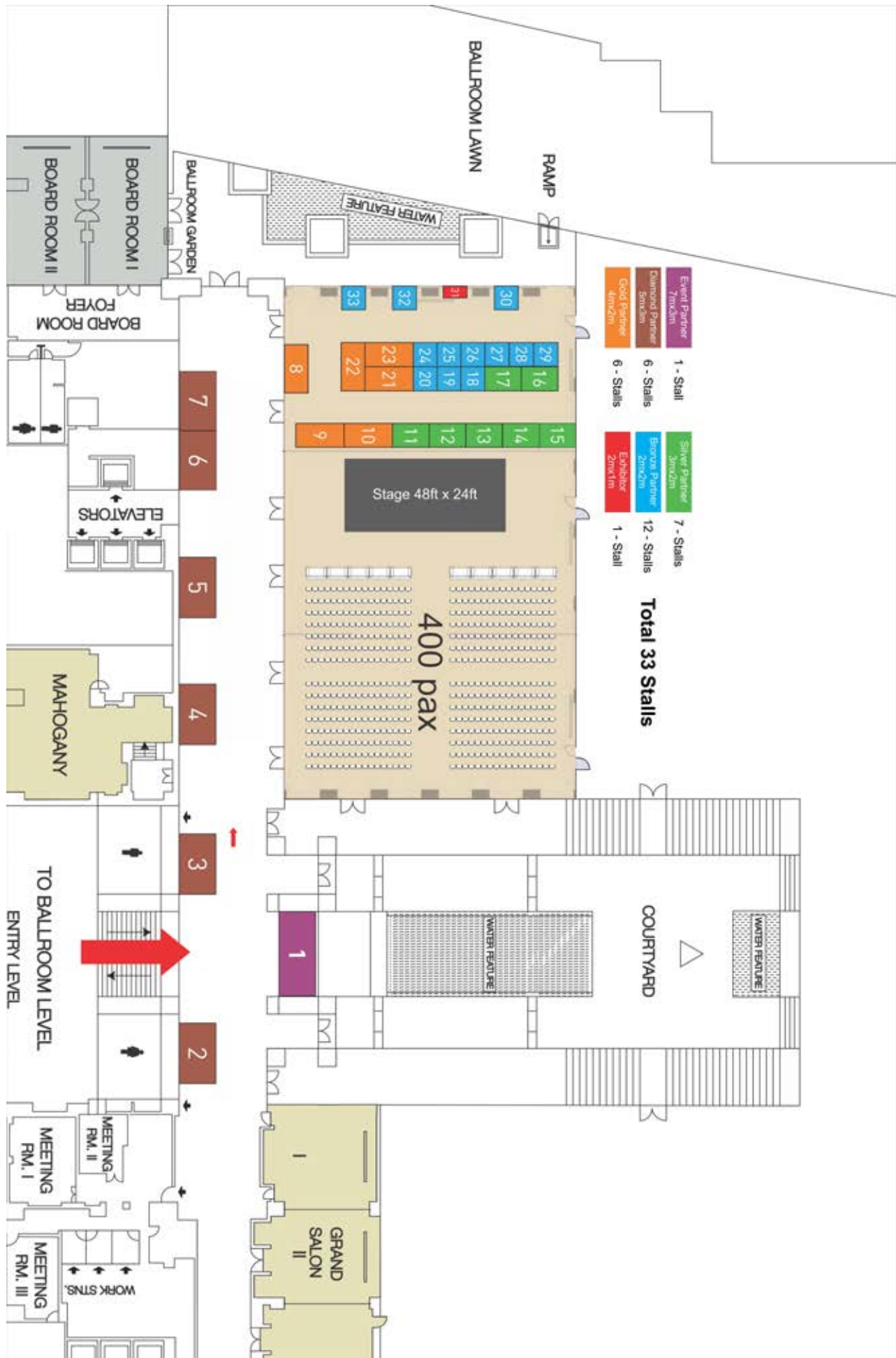
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TABLE OF CONTENT

	PAGE NO.
Opening Ceremony Programme_____	1 - 2
Conference Schedule - Day 2_____	3 - 5
Conference Schedule - Day 3_____	6 - 7
Messages_____	8 - 16
About OTAI_____	17
About OTAI - WZ_____	18
FOIC 2023 Committees_____	20 - 21
OTAI Central Executive Committee_____	22 - 23
OTAI Zonal Executive Committee_____	24 - 25
Exhibitors_____	26
Speaker Profile & Abstracts_____	27 - 107

OTAI FOIC 2023 VENUE LAYOUT



FATS & OILS INTERNATIONAL CONFERENCE & EXHIBITION

Organized by: The Oil Technologists' Association of India, Western Zone

OPENING CEREMONY

DATE : Thursday, 16th March 2023

Time	Topic	Speaker & Affiliation
15:00 Onwards	REGISTRATION	MEDIVISION & TEAM Registration to continue
17:30 - 18:30 (60 Min)	HIGH TEA	
18:30 - 18:35 (5 Min)	Greetings by MOC & Ganesh Vandana	ALL
18:35 - 18:42 (7 Min)	Inviting Dignitaries on the Dias & Lightning of the Lamp	MOC
18:42 - 18:49 (7 Min)	Welcome	Mr. Satish V Khadke President OTAI WZ
18:49 - 18:57 (8 Min)	Welcoming All Dignitaries with Bouquets	
18:57 - 19:05 (8 Min)	Brief Industry Outlook & FOIC Role	Mr. D V Chame Conference Convenor FOIC 2023
19:05 - 19:13 (8 Min)	Introducing Conference Theme & Technical Sessions	Mr. Kamalesh Kapadia Conference Chairman FOIC 2023
19:13 - 19:21 (8 Min)	About Oil Technologists' Association of India	Dr. Rajeev Churi All India Vice-President OTAI
19:21 - 19:29 (8 Min)	Indian Vegetable Oil Scenario	Mr. D. Mathur All India President OTAI
19:29 - 19:39 (10 Min)	Address by Guest of Honour	Prof. Aniruddha. B. Pandit Vice Chancellor ICT MUMBAI

DATE : Thursday, 16th March 2023

19:39 - 19:49 (10 Min)	Address by Guest of Honour	Mr. Nadir. B. Godrej Chairman & Managing Director Godrej Industries Ltd.
SOUVENIR RELEASE		
19:49 - 20:04 (15 Min)	Address by Chief Guest	Padma Vibhushan Dr. Anil Kakodkar Chancellor, Homi Bhabha National Institute Chairman, Rajiv Gandhi Science & Technology Commission Former Chairman, Atomic Energy Commission of India
20:04 - 20:09 (5 Min)	Vote of Thanks	Mr. Shekhar Surve Hon. Secretary OTAI WZ
VISIT TO EXHIBITION		
20:10 onwards	ENTERTAINMENT PROGRAME	
21:10 onwards	DINNER & DRINKS	NETWORKING



FOIC-2023: TECHNICAL PROGRAMME**Friday, 17th March 2023**

Time	Topic	Speaker & Affiliation
09:30 - 09:50 (20 Min)	Conference Theme Presentation Industry Trending to Theme Conceptualization	Mr. Kamalesh Kapadia Conference Chairman & Ex CEO & CMD Desmet KONCEPT -N- KLARITY

MODULE ONE: Key-Note Lectures - 09:55 - 11:15

09:55 - 10:35 (40 Min)	KL 1 Technical Audit of Installed Edible Oil Refineries & Updating it to Recent Technology and Energy Efficient Processes	Mr. D V Chame CMD DVC Process Technologists, Pune, India
10:35 - 11:15 (40 Min)	KL 2 Sustainable Oil Processing: Moving towards CO2-Neutral Refining	Dr. Marc Kellens Global Technical Director De Smet, Belgium

11:15 - 11:40 (25 Min) - TEA BREAK**MODULE TWO: Technical Advancements in
Fats & Oils Processing - 11:40 - 13:05**

11:40 - 12:05 (25 Min)	TA 3 Technology Upgrades in Oilseed Extraction Processes and Developments in Value Addition	Mr. Biju George Palayil CEO Kumar Metal Industries Pvt Ltd
12:05 - 12:30 (25 Min)	TA 4 Importance of Crude Oil Filtration before Refinery and in Solvent Extraction Plants	Mr. Sandeep S Khadke Managing Director Sharplex Filters (India) Pvt. Ltd. Mumbai, India
12:30 - 12:55 (25 Min)	TA 5 Mitigating 3-MCPD & GE Content in Edible Oil: Latest Technologies & Innovations	Ing. Daniele Mora Technical Director TECHNOLOGY s.r.l., Rome, Italy
12:55 - 13:05 (10 Min)	TAT Latest Developments in Savour-cum- Inhouse Regeneration of Energy in Fats & Oils Refinery	Mr. Riyaz Tanvar Director Marketing & Operational N&T ENGITECH PVT LTD

13:05 - 14:00 (55 Min) - LUNCH BREAK

FOIC-2023: TECHNICAL PROGRAMME

MODULE TWO: To Continue after LUNCH - 14:00 - 14:50

14:00 - 14:25 (25 Min)	TA 6 Innovative and Cost Effective Refining Process for Meeting Quality Compliances of Vegetable Oils	Dr. Amol J. Gore Manager (Process Technology) Muez Hest India Pvt. Ltd. Mumbai, India
14:25 - 14:50 (25 Min)	TA 7 Scientific and Emerging Trends in Process Lines from Cottonseed to its Oil and its Value-added Products	Mr. Jenendra Bohra Executive Director Ferro Oiltek Pvt Ltd. Thane, India

MODULE THREE: Innovative Enzymatic Applications in Fats & Oils Processing - 14:55 - 16:15

14:55 - 15:20 (25 Min)	EN 8 Innovations in Rice Bran Oil Processing and Related Products - A Journey from Prototype to Scale Production	Dr. R B N Prasad Former Chief Scientist & Head Dr. P P Chakrabarti Chief Scientist & Head Centre for Lipid Research, CSIR-Indian Institute of Chemical Technology, Hyderabad, India
15:20 - 15:50 (30 Min)	EN 9 Innovative Enzyme Technologies for a Greener and Sustainable Fats & Oils World	Dr. Yee Hon Seng Industry Technology Manager Novozymes, Malaysia Mr. Rohit A. Bangera Business Development Manager Novozymes South Asia Pvt Ltd., Bengaluru, India
15:50 - 16:15 (25 Min)	EN 10 Enhanced Profitability & Quality for Soft Oils Refining	Dr. J. Sambasiva Rao Managing Director Shirdi Sai Nutraceuticals Pvt Ltd, Bengaluru, India

FOIC-2023: TECHNICAL PROGRAMME

16:15 - 16:40 (25 Min) - TEA BREAK

MODULE FOUR: Food Safety & Regulatory Demands - 16:40 - 18:00

16:40 - 17:05 (25 Min)	FS 11 Application of Ultra-scientific Tools for the Quantitative Detection of Adulteration in Edible Oils and Fats	Dr. R D Kulkarni Senior Professor, Department of Oils, Oleochemicals and Surfactant Technology Institute of Chemical Technology, Mumbai, India
17:05 - 17:35 (30 Min)	FS 12 Uncovering the Hidden Hazards: Mastering the Testing of Edible Oils for Harmful Compounds	Mr. Wim Broer Science and Development Manager NofaLab, Schiedam, Netherland
17:35 - 18:00 (25 Min)	FS 13 Importance of Regulations for the Quality and Safety of Edible Oils & Fats	Dr. Prabodh Halde Head, Regulatory Marico Limited, Mumbai, India

18:00 - 19:30 (90 Min) - Networking & Visit to Exhibition Stalls

19:30 Onwards - Cultural Programme & Dinner



FOIC-2023: TECHNICAL PROGRAMME**Saturday, 18th March 2023**

Time	Topic	Speaker & Affiliation
MODULE FIVE: Key-Note Lectures - 9:30 - 10:50		
09:30 - 10:10 (40 Min)	KL 14 D3PRO - A Green Clarification System: Best Oil Yield with Lowest Effluent Generation Coupled with in situ Mitigation of 3-MCPDE in Palm Oil Mills	Mr. Hong Boon Kheng Global Sales Manager (Crude Palm Oil and Latex Application) Alfa Laval Malaysia Sdn. Bhd., Malaysia
10:10 - 10:50 (40 Min)	KL 15 Current Dynamics of Vegetable Oils / Oilseed Sector – Key Issues and Opportunities	Mr. Sudhakar Desai CEO, Emami Agrotech Ltd. Kolkata India & President, Indian Vegetable Oil Producers' Association (IVPA)
10:50 - 11:20 (30 Min) - TEA BREAK		
MODULE SIX: Energy Conservation: Renewable as well as Sustainable - 11:20 - 13:00		
11:20 - 11:45 (25 Min)	EC 16 Getting Net Zero By 2050	Ms. Aarti Chame Chief Operating Officer DVC Process Technologists, Pune, India
11:45 - 12:10 (25 Min)	EC 17 Green Energy & Green Hydrogen Solutions for Net Zero Transition of Vegetable Oil Industry	Mr. Shardul Kulkarni CEO Deesha Power Solutions Pvt Ltd. Mumbai, India Mr. Sriniviswanathan CEO Vibrant Energy, Hyderabad, India
12:10 - 12:35 (25 Min)	EC 18 Solutions to Reduce Carbon Emissions in Effective Way in Oils & Fats Industry with Specialized Mass Transfer and IOT-based Technology	Mr. Chetan Sayankar Managing Director S Cube Mass Transfer Pvt Ltd. Pune, India
12:35 - 13:00 (25 Min)	EC 19 Novel Process Technology for Upgrading Fats, Oils and Greases to Renewable Diesel and Sustainable Aviation Fuel	Mr. Sashikant Madgula Business Segment Leader Clean Fuels & Chemical Licensing Group Sulzer Chemtech, Houston, U S A

FOIC-2023: TECHNICAL PROGRAMME

13:00 - 14:00 (60 Min) - LUNCH BREAK

MODULE SEVEN: Role of Automation & Instrumentation in Fats & Oils Industry - 14:00 - 15:40

14:00 - 14:25 (25 Min)	AI 20 DIGITALIZATION – Solutions for Edible Oil Industry	Mr. Premanand Vettukattil Vice President (Automation) Desmet Ballestra India Pvt Ltd., Bengaluru, India
14:25 - 14:50 (25 Min)	AI 21 Role of Instrumentation in Predictive Diagnosis of Critical Process Parameters in Fats & Oils Refinery	Mr. Sanjeev Saraswat Senior Executive, Process Management & Execution Yokogawa India Limited, Bengaluru, India
14:50 - 15:15 (25 Min)	AI 22 Process Automation Advancements & Challenges for Fats and Oils Industry	Mr. Shriram Pendse Head Max Controls, Pune, India
15:15 - 15:40 (25 Min)	AI 23 Role of Automation in Improving Efficiency of Production in Edible Oil Industry	Mr. Ritesh Raka Manager (Business Development - Food & Beverages) Siemens, Mumbai

15:40 - 16:15 (25 Min) - TEA BREAK

16:15 - 17:15 - Panel Discussion

17:15 - 17:45 (30 Min) - Valedictory Function

17:45 - End of Conference

MESSAGE

NATIONAL PRESIDENT



Mr. D Mathur
National President, OTAI

The members of Central Executive Council and myself are very proud to present the Fats & Oil International conference & Exhibition organised by Western Zone of Oil Technologists Association of India under theme of "Meeting the challenges of Energy Efficient Process Innovation & Automation" in Mumbai during 16th to 18th March 2023.

The Conference aimed at energy efficiency in fats, Oil & Oleochemical sector is essential need and pressing Priority. This will be an action packed event for every participant with various activities including a technical exchange, networking, visit to exhibition stalls and cultural program. The event will focus on the technological advancements and the digital transformation happening in the areas of process, maintenance and quality assurance management. With more processes being automated than even before, we will explore the various possibilities and it will be the perfect platform for international and regional professionals, researchers, service providers and end users to explore the latest in the digitalisation world. In addition, an exhibition is also planned for companies and service providers to showcase their latest products and services and to interact with the delegates.

We are confident that this conference and exhibition will prove to be a unique platform where all levels of industry leaders and specialists associated with processes, maintenance and quality assurance management will join to share their expertise which will enrich such a highly professional event.

Looking forward towards more energy and environment security for the benefit of humanity and our planet.

My personal respect goes out to all of you.

MESSAGE

PRESIDENT



Mr. Satish Khadke
Chairman, Sharplex Filters
(India) Pvt Ltd

It is my pride privilege to write a message in the Souvenir which is dedicated to the proceedings of the Fats & Oils International Conference 2023 (FOIC 2023) being held in Mumbai at Hotel Grand Hyatt during 16th – 18th March 2023.

The Oil Technologists' Association of India (OTAI), founded in 1943 is a premier organization of Technologist's, Research Scholars, Managers, Engineers & Industrialists.

OTAI continues to strive to provide a unique, effective platform for Oil & Fats chemists, engineers to publish, present, network and advance their careers. Therefore, if you are not a member of OTAI yet, please consider joining this dynamic Association now.

I have witnessed a lot of brainstorming sessions carried out by Technical Committee headed by Dr. RBN Prasad – Former Chief Scientist CSIR – ICT, Hyderabad and supported by Mr. Kamlesh Kapadia, ex-CEO Desmet Ballestra to select the presentation papers. Needless to say that it is a great effort on part of technical committee to receive large number of technical abstracts and accepting these after a critical review and lining these abstracts systematically into the categorical themes and sessions. I am thankful to them for their precious time & efforts.

I am thankful to all Sponsors, Exhibitors, Speakers, Students for their whole hearted support to FOIC 2023. I am thankful to organizing committee of FOIC 2023 who worked day & night to plan FOIC 2023.

I also thank all delegates of FOIC 2023 and appreciate your participation and hope you will find this conference stimulating & rewarding.

While the conference promises to be outstanding experience, I hope that you will also enjoy Vibrancy the city of Mumbai, has to offer in the days before, during & after the conference.

Thank you all

MESSAGE

CHAIRMAN

OTAI WZ-FOIC 2023 Steering Committee



Mr. Nadir Godrej
Chairman, Godrej Industries Ltd.

I am pleased to inform you that the Oil Technologists' Association of India (OTAI), Western Zone, is organising the Fats & Oils International Conference and Exhibition, FOIC 2023 with a theme titled **"Meeting The Challenges of Energy Efficient Process Innovations & Automation"** during March 16-18, 2023 at Grand Hyatt, Mumbai.

India's high dependence on import of Edible Oils continues to be a challenge to meet domestic demand at reasonable price. The Indian government is doing its bit by encouraging an increase in oil cultivation by offering better MSPs and also promoting Oil Palm plantation to reduce import dependence and save foreign exchange.

India has a vast cultural spread leading to requirements of different oils catering to different tastes and choices. The industry, accordingly is required to offer to consumers, the best quality across a variety of Edible Oils by retaining natural nutrients present in the source, at the same time preventing the generation of harmful molecules during oil processing. This needs a greater understanding and up-gradation of process technologies for oils.

Green and renewable energy is the need of the hour and so is putting a greater emphasis on making our operations more energy efficient. Energy audit of existing operations as well as up-gradation could be the way to optimise our energy requirement and thus reduce the cost of processing.

Today's consumers are well aware of the health and nutritional aspects of the oil they use for cooking; their preferences also change from region to region.

Considering enhanced consumer awareness, increased and stricter regulatory requirements, it is important to bring our Edible Oil industry members, technologists and regulatory agencies under a single platform.

The FOIC 2023 organising team, consisting of scientists and technologists associated with the Edible Oil Industry, has diligently worked on the theme right from conceptualisation to coming out with an array of speakers of national and international repute on one platform with a pinpointed vision to serve current & future needs of the Edible Oil Industry and Consumers and to constantly evolve technology, quality and deliver products using renewable and energy efficient processes.

In the past OTAI WZ has organised several international conferences successfully on various themes covering Edible Oils, Oleochemicals, Personal and Home Care products & surfactants. With OTAI's technological expertise, I am sure all the participants of the conference and industry members supporting this event will be enormously benefited in understanding the latest innovations and developments in automation and energy efficient processing as well as meeting regulatory requirements.

On behalf of the "Steering Committee" of the "OTAI-WZ-FOIC 2023 Conference & Exhibition", consisting of business leaders of various industries, I invite members of the Edible Oil and allied industries to support and actively participate in the conference and make this event a truly memorable one for everyone.

MESSAGE

CONFERENCE CHAIRMAN



Mr. Kamalesh Kapadia
EX- Chairman & MD, Desmet Ballestra
India Pvt. Ltd

Dear Friend and delegates, when we decided the theme of the conference FOIC 2023 , **"Meeting the challenges of energy efficient process innovation & automation"** , we have had a clear vision as to what this theme would mean to the Indian F&O Industry in coming few years... how the technologies would shape in coming 23 years after 2023! First of all we decided to look into as to what are the technical trends, not only in refined oil segments but also in oil seed processing segment with an eye on energy, environment, food/feed safety aspects as well as cost effective processes in lieu of increased competition and reduced margins.

One of the industry trends is increased concern on environment forces to reduce waste and effluents, chemicals and additives, noise and odour as well as energy usage that ultimately would results in saving in costs and increase the profitability of the process. Main effluents from the process house is waste water... Approx. 90 % of total waste water is emerging from edible oil refineries... We needed to look into the processes and technologies that would address the issues & would ensure to minimise the waste from the process house..

Another concern is food and food safety.. we need to select mild processes that would retain natural ingredients such as vitamins and proteins, removes the contaminants such as 3 MCPDs, Mineral Oil Straight Chain Hydrocarbon, (MOSH) and Mineral OIL Aromatic Hydrocarbon (MOAH) so also simultaneously minimising the side reactions for Trans Fat formation, hydrolysis etc.... what is important that we should have quality foods that protects our health..

MCPD & Analytical methods then comes into the play. Fatty acid esters of 2- & 3-monochloropropane-1,2-diol (2- & 3-MCPDE) and glycidol (GE) are heat-induced food-borne contaminants which might have adverse health effects to consumers. As these compounds are generated mainly during the refining of edible oils and fats or by heat-treatment of other oil- & fat-containing foods, they do occur widespread in a large variety of essential foods and correspondingly raised a lot of attention from NGOs and authorities

Due to the importance of this topic, a large number of analytical methods for the determination of 3-MCPD(E) and GE in various foods has been invented. Meanwhile, a series of officially validated methods is available for analysis of edible oils and fats.

CONFERENCE CHAIRMAN

Increased competition and reduced margin has compelled the processors to go for, cost effective process, fully automated flexible plants... The large capacity installation are key to have benefits derived from economies of scale..

So what are the main drives of change today?

On one side it is regulatory involving, safety, environments, including renewable energy, & food safety. On the other hand it is financial involving issues like cost, capacity and technology. Industry also have to focus on commercial aspects looking into the needs continuously evolving customer demands...

So what are the naturally available renewable energy that Fats & Oil industry looks into utilizing?

Five major types of Renewable energy:

1 WIND - wind flows over the blades of wind turbines, to produce electricity – 6.6% of global electricity generation as per 2021.

2 GEOTHERMAL: hot water from underground reservoir is pumped using pipes or walls; as water reaches the surface, it boils over into steam, which rotates a steam turbine; the turbine connected to a generator that produces the electricity – only < 1% of global electricity generation

3 HYDRO : water flows from the dam generating mechanical energy that spins a turbine connected to an electric generator; - 15.3 % of global

4 SOLAR : Photovoltaic (PV) cells contain thin semiconductors wafers forming an electric fields'; when light hits the cell electron are knocked loose from the semiconductor material and move in response to the electrical field ; this generates electricity transferred through metal conductor on the PV cell – 3.7%

5 BIOMASS: Biomass is burnt in the boiler to produce the steam: steam generate electricity through turbine – 2.3%

The latest on the market would be hydrogen energy. Fuel cell.. Green Hydrogen is used to reduce the carbon footprint and switch to renewable energy sources. It is hydrogen that is produced in eco-friendly ways. Nuclear energy and natural gas are not used in their production. It is formed by the process of electrolysis, meaning current is passed through water to create green hydrogen. **Doing so will reduce 830 million tons of harmful carbon dioxide emissions annual**

The next area is to look into the scenario in India for food safety and directly responsible organization FSSAI?

Oil bottling and packaging is of increased importance as well as anti-adulteration consideration leading to more demands on automation ...

CONFERENCE CHAIRMAN

The Union government has asked manufacturers, packers, and importers of edible oil to declare the net quantity of the commodity without temperature, and to ensure that the volume and mass declared on the package are correct.

The weight of soya-bean edible oil may be different at different temperatures keeping the volume one litre," said the government in a release. In an example, it highlighted that the weight of soybean oil at 21 degrees may be 919.1 gram, while that at 60 degrees may be 892.6 gram.

They have also been advised by the consumer affairs ministry to correct their labelling of declaring net quantity in units of volume without mentioning temperature with weight of the product by 15 January, 2023.

Under regulatory demands, the better documentation is needed such as built P&ID, Lesar scanning , electrical health assessments.. Etc

The financial trends covers the cost and capacity aspect of operations.. Cost saving is not really a new trend, but more flexibility is demanded.. It is observed that small & newer plants produce wide varieties of products with increased automation. On the other hand older big capacity plants are adding co-products manufacturing facilities such as lecithin, vitamins to sustain the profitability as well as full utilization of installed capacities All efforts are towards better capacity utilization with cost effective operations..

Under the technology aspect, we find that industry is sometimes resistant to change.. Fewer technology suppliers dominate the big markets, a proven technology is a mantra..

Thus technology Innovation has to RISE That means it Should be Reliable, Integrated, sustainable and most energy efficient in the chosen market

But change is happening for sure... EIE with coconut and Palm oil has replaced hydrogenation completely

New awareness of storage capacity is caused by COVID 19 demand shift as well as in site blending of different oils for customised product mix as well as flexibility..

Palm oil Mill Effluent's (POME) is the main cause of environmental pollution due to its high acidity, high biological oxygen demand (BOD) and chemical oxygen demand (COD). Though D3 PRO technology launched in the year 2014, now it would be a must system to process the additional capacity of CPO that will be produced by the year 2030 D3 PRO is a process that allows:

- Recover lost oil by for higher yield – approx. 0.1% oil extra to FFB

- Separates without dilution water – less quantity of POME

- Reduction of effluent by 30%

- More energy efficient – reduce energy, water and maintenance cost

CONFERENCE CHAIRMAN

Another aspect of technology RISE is digital transformation that is taking place in modern processing units with latest instrumentation and analytical techniques. What is required today is remote access, faster changeover, more data for optimization and consistency...

Automation is key to cost efficient processing of oils and oilseed..

Few years ago, only 20% of the processing plants were supplied with medium level automation, however, today 95 % plant are supplied are automated using PLC and SCADA or medium size DCS. The extension and application of the internet of things (IoT) in industrial sectors and applications are referred to as the industrial internet of things (IIoT). The Machine-to-Machine (M2M) Internet of Things (IIoT) enables businesses and industries to operate more efficiently and reliably because of its strong emphasis on M2M connectivity, big data, and machine learning. Industrial applications such as robotics, medical technology, and software-defined production processes are all included in the IIoT.

Increased use of the industrial IoT market due to the adoption of artificial intelligence (AI) and machine learning (ML) in the end user industry is also driving the market's growth. The higher probability of device theft and data breaches is expected to restrain the industrial IoT market. Growing internet penetration and digitalization across the globe are an opportunity for the industrial IoT market. High installation costs and difficulties in integrating IoT devices are challenging the global industrial IoT market

The main purpose of automation is to have a data acquisition, which allows to record as to what is happening in the plant.. Automation surely contributes to a substantial lowering of the overall operating cost

New features like the new IT technologies, have been integrated in the PLC functions, making the PLC the real controlling hearts of today's Fats & Oil industry installations.

Automation and Management information system goes hand in hand. However, but if we see that 70% cost of system works out to be of field control devices such as Temperature, Pressure and Flow transmitters, valves and drives etc... Thus instrumentation is also an integral part of good automation to perform..

Under the commercial trends and looking at evolving consumer demands in the years to come, we see the scenario of global oilseed market by 2026:

- 1 Trans fats would be totally out.. Hydrogenation would be limited to non-food applications
- 2 Trends of NON GMO to ORGANIC... organic oil seeds requires segregation and no hexane extraction is allowed.
- 3 New plants being built with mechanical extraction just for a growing demand for organic oils

CONFERENCE CHAIRMAN

We also see that novel oil are emerging with new market opportunities..

Biodiesel market is growing but with new technology and diversity.. Hydro treated Vegetable Oil (HVO) commonly referred to as 'renewable diesel', is produced via Catalytic hydro-processing of oils and fats, consisting of paraffinic hydrocarbons.

The term HVO is used for renewable diesel fuel produced via a so called hydrotreating process (hydrogenation and hydrocracking) of different feed stocks .. such as vegetable oils, waste cooking oil or UCO, animal fats, acid oils and fatty acid distillates..

HVO, is also called green diesel, has similar properties as fossil fuels but with some difference such as lower density, and higher energy content , is free from oxygen and aromatic hydrocarbon and has higher CETANE numbers..

HVO is made by saturating the double bonds in the fatty acid molecules of vegetable oils and animal fats with hydrogen. Propane is produced as a by-product. The product can be modified in the HVO production process, so that HVO can be blended with fossil fuels at 7 percent (the same as biodiesel) or more to make renewable diesel or bio-kerosene. This means that HVO can be incorporated specifically and irrespective of the time of year (winter quality) for existing vehicle fleets in the carriage of goods or in traditional kerosene. Contrary to fatty acid methyl ester (biodiesel) production, this method involves very high investment costs.

The technologies in 2023 and beyond therefore has to be the main theme of the conference..

The conference deliberations are based on Six modules covering the most of the aspects outlined in above paragraphs...

The panel discussions would be a concluding finale that should bring out a 'deep dive" white paper , which is an in-depth report or guide about a specific topic and the problems that surround it.. It should educate the delegates and help them to understand and solve an issues they might have been facing in day to day operations.



MESSAGE

CONFERENCE CONVENOR



Dr. D.V. Chame, CMD
DVC PROCESS TECH. INDIA LTD.,
PUNE, INDIA

THEME – MEETING THE CHALLENGES OF ENERGY EFFICIENT PROCESS INNOVATIONS & AUTOMATION

Today's competitive business environment, edible oil & oil seed processing business becoming challenging due to market volatility because of the reasons beyond control of the industry!

Along with trading expertise, control over manufacturing / production cost is in the hands of the industry!

In oil refining, apart from chemical consumptions and oil losses other factors like energy consumption and process control are of great importance.

FOIC 2023 is aimed at discussing the said aspects related to processing and making processors aware about their current process plant status and correlating with what's the latest trend and standards in reference to technological updates!

Attaining energy efficient operations is the responsibility of every process and allied industry as the cause of helping to preserve natural resources and control over greenhouse gases emissions!

Adopting the updated and efficient processing technologies not only help to minimise energy consumptions but also deliver better quality product & byproducts which together reflect in control over processing cost.

Having efficient process control is possible by means of automated operations using PLC / DCS systems with facility of data logging to evaluate and understand the process and its operations trend. Also, the process automation helps in evaluating processing cost at any given point of time can become valued input to take appropriate operational and commercial decisions!

So, I can confidently say FOIC 2023 do have lot to takeaway for delegates who are in the role of decision makers and process experts of the industry. Their attendance whole heartedly may help to stimulate the idea of updating the processing facilities in their own interest as well as in the interest of masses!

Thank you all and wishing every success!

ABOUT OTAI

The Oil Technologists' Association Of India (OTAI), founded in 1943 is a premier organization of technologists, research chemists, managers, engineers and industrialists working for the production, processing and research on oilseeds, oils, surfactants and allied products. It has membership of over 1600 from all over the world.

The Association functions through five autonomous zones, viz. Central at Kanpur, Northern at New Delhi, Eastern at Kolkata, Western at Mumbai and Southern at Hyderabad. The activities of the zones and the central committees are coordinated by the OTAI head quarter at Harcourt Butler Technological Institute (HBTI), Kanpur.

The foremost aim of the Association is to promote advancement of the knowledge in the fields of chemistry and technology of oils, fats, surfactants and related products. It also aims to raise the status and professional competence of its members. It also endeavours all-round rational economic development of the oils and fats resources of the country and their utilization. The Association publishes a quarterly journal ,the Journal Of Lipid Science and Technology, which is of international repute.

The OTAI has been recognized by the Department of Science and Technology, Govt. of India, as a scientific and research organization devoted to promotion of R & D activities in the area of Oils. Fats and Derived Products. The Association is represented on various National Committees such as Central Committee of Food Standards, Development Council for Soaps and Detergents, different Committees of Bureau of India Standards.

At present OTAI is headed by Mr. D. Mathur.



The Oil Technologists'
Association Of India

www.otai.org

ABOUT OTAI - WZ

The Oil Technologists' Association of India Western Zone (OTAI-WZ) was established in 1960 under the leadership of late Prof. J. G. Kane with initially just 16 members. Over the last 5 decades, OTAI-WZ has grown from strength to strength under the inspiring leadership of the past eminent Presidents and today has a membership of over 700, which is the highest among the 5 zones of OTAI.

OTAI WZ has played an active role in furthering the objectives of the Association since its inception. The zone has organized over 27 refresher courses / workshops and 34 Seminars on national and international Scale from 1968. Notable among them are 50th Annual Convention combined with International Seminar and Expo at Mumbai in 1995. National Seminar on "Newer Business Trends in Oleochemicals " at Mumbai in 2003. Asian Conference on Soaps, Detergents and Cosmetics (ASDC) at Goa in 2005. National Seminar on " Value Addition of Oleochemicals " at Mumbai in 2006. International Conference on Soaps, Detergents and Cosmetics (RSDC) at Goa in 2008. International Conference on Soaps, Detergents and Cosmetics (ISDC) at Mumbai in 2011. National Seminar on "Latest Developments in Vegetable Oil Processing" at Mumbai in 2012. International Conference on Soaps, Detergents and Cosmetics (ISDC) at Goa in 2014. SCODET Asia Conference at Mumbai in 2016 and 2017.

The Western Zone is able to function efficiently due to the tireless efforts put in by the office bearers and other executive committee members many of whom also took additional responsibility as Conveners of the sub-committees of the conference. Due to its varied activities, OTAI WZ was able to have its impact on the development of several technologies, research activities, implementation of essential fiscal measures and imparting technical training to the personnel associated with the oil Industry. OTAI WZ and Malaysian Palm Oil Council (MPOC) have signed a MOU in 2017 to promote research and create awareness about the usefulness of palm oil.

The Oil Technologists' Association of India (OTAI), founded in 1943 is a premier organization of technologists, research chemists, managers, engineers and industrialists working for the production, processing and research on oilseeds, oils, surfactants and allied products. It has membership of over 1600 from all over the world. The Association functions through five autonomous zones, viz. Central at Kanpur, Northern at New Delhi, Eastern at Kolkata, Western at Mumbai and Southern at Hyderabad. The activities of the zones and the central committees are coordinated by the OTAI head quarter at Harcourt Butler Technological Institute (HBTI), Kanpur.

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Presently OTAI is headed by Mr. Satish V Khadke.



|| Shraddhanjali ||



September 1, 1956 - March 4, 2023

All members of OTAI-West Zone condole the untimely demise of Shri Sunil Onkarnath Manaktala, Managing Director of M/s. Kumar Metal Metal Industries Pvt. Ltd.

He was also a member of steering committee of FOIC-2023.

We pray God Almighty to rest his soul in peace.

OTAI-West Zone

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Abstracts of the Lectures at FOIC 2023

MODULE 1 - KEY-NOTE LECTURES

Technical Audit of Installed Edible Oil Refineries & Updating to Latest Processing Techniques with Energy Efficiency

KL1

Mr. D. V. Chame

CMD, DVC Process Technologists, Pune, India

The focus of this conference is in support of edible oil processing industry – present as well as proposed to adopt the latest technological aspects alongside energy efficiencies. In current scenario worldwide, energy costs are dearly going up so the processing costs! Now energy becomes one of the raw materials for the process industries prominently for oil refining industry.

It's need of the hour to study the current oil refining facilities for energy consumption and comparing with updates as well as with required finished product quality standards by way of auditing. Systematic process audit of existing plants will help to understand the health of the processing facility, on the basis can be concluded for necessary maintenance or updating the facility on process design front. It's very possible to update the existing processing facility to upgrade and match to the latest processing techniques along utilities consumption pattern. This will save on investment, time and processing cost.

It's observed at many places, the new processing facilities are also not to the mark the reasons may be any and many. OEMs' need to be sincere and supportive to process industry to resolve the issues and make sure the facility is to the mark as committed. To monitor plant performance on regular basis, need to have necessary instrumentation supported by process automation, could able to keep track of operations, processing cost and also product quality.

Energy savings is never ending task, the process industry need to be alert always, with hand in hand approach with the OEM, processing plant system integrators / providers can make difference to move forward in saving the environment as universal cause with no boundaries.

The details of the case studies will be furnished with facts & figure during the presentation.

ABOUT THE SPEAKER



Mr. D.V. Chame

CMD, DVC Process Technologists,
Pune, India

Mr. D.V. Chame is the CMD of M/s DVC Process Tech. India Ltd. Pune. He obtained M.Sc. in Organic Chemistry from Marathwada University, Aurangabad and Diploma in Industrial Management from L.N. Welingkar Institute of Management & Research, MUMBAI. He has diversified experience in vegetable oil processing, process control & analytical laboratory, production, maintenance and administrative responsibilities. Mr Chame gained extensive experience in different organizations like M/s Liberty Oil Mills, Hindustan Petroleum Corp. Ltd., Alfa Laval India Ltd. and Malwa Vanaspati & Chemicals Ltd. and rose from Production Shift In charge to Vice President. Mr Chame instituted "DVC Process Technologists" in 2001 for supply of turnkey projects and solutions for Fats & Oils with his diversified expertise in extraction and processing as well as by-products, oleochemicals and biodiesel. DVC is the first company offering PLC based affordable process automation solutions to small and medium capacity oil refining projects. DVC successfully implemented several activities like True retention in continuous bleaching system, Zero flash deodorizer system, Two stage scrubbing system for toco-rich constituent, Oil Refinery and by products like soap stock acidulation section under one roof with zero acidic vapor discharge, Hybrid vacuum system for differential pressure required in processing, efficient lecithin drying plant, Low trans deodorizer system for soy and sunflower oils, 150 TPD cont. Alkali catalysed multi feed stock biodiesel plant. Mr Chame has passion for developing energy efficient processing techniques and equipment design and processing systems with net zero emissions by way of using non-conventional energy resources and recyclable bio based fuel resources.



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MODULE 1 - KEY-NOTE LECTURES

Sustainable Oil Processing: Moving towards CO₂-Neutral Refining

KL2

Dr. Marc Kellens

Global Technical Director, De Smet, Belgium

More than 250 Million tons of oils and fats are being processed every year, with 88% vegetable oils and 12% animal fats. Most of the vegetable oils are used in food, whereas most animal fats are processed into oleochemicals and biofuel.

The increasing consumers concern about what they eat is pushing the industry to continuously improve the quality and safety of oils in human food but also in animal feed. Many waste oils like used cooking oils, refinery side streams like fatty acid distillates and acids oils, are more and more banned from being reprocessed into food or feed. These streams are ideal feedstocks for the biofuel producers, particularly the HVO industry.

The edible oil refining industry is being challenged on and on to prevent or reduce various contaminants like trans fats, glycidyl esters, 3MCPD's, PAHC's, MOSH and MOAH while preserving the nutritional quality. Technologies are constantly improved, and new solutions developed to further enhance the quality and safety of the edible oils.

With palm oil and soybean oil representing 2/3 of world vegetable oil production, it is evident that most attention goes to these 2 dominant oil sources.

The industry is also confronted with the ongoing climate changes, requiring the processes to become more environment friendly by reducing where possible chemicals and waste streams. Soaring energy prices and waste disposal costs are further drivers to make the refineries of the future more energy efficient and to reduce their carbon footprint.

The technology supplier's task is to turn such challenges into opportunities by developing more efficient, more sustainable technologies, whereas the oil processor's responsibility is to ensure a more healthy and safe food oil. Good and open exchange of information between the two partners is of utmost importance and the best guarantee to jointly face every problem and new challenge to come.

ABOUT THE SPEAKER



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Global Technical Director,
De Smet, Belgium

Dr. Marc Kellens is the Global Technical Director of De Smet. He joined De Smet Ballestra, Belgium in 1991 as Manager R&D. Since 2003 he is responsible as Global Technical Director for the oils and oilseeds technologies and oleochemical processes developed, designed and built by the De Smet. He carries R&D in his heart and is today still strongly involved in the new product developments and R&D activities of the De Smet. He has an engineering degree in food processing and technology and a PhD in oils and fats crystallization. Dr Kellens is author of numerous scientific articles and chapters in oils and oilseeds related books and has several patents in oil and oilseed processing technologies. He is a recurrent speaker at conferences and seminars presenting various topics of interest covering a broad field of oils, fats and oleochemical processes and products. He received the prestigious European Lipid Technology Award of Euro Fed Lipid in 2007 and the AOCS Distinguished Oil Processing Division Award in 2015. He received the Fellow of Euro Fed Lipid (FEFL) Award in 2017 and Honorary Fellow Award from the Malaysian Oil Scientist's and Technologist's Association (MOSTA) in 2018. He was president of the European Federation for the Science and Technology of Lipids (EFL) from 2010 till 2013 and president of the International Society of Fat Research (ISF) in 2013-2014.

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MODULE 2 - TECHNICAL ADVANCEMENT IN FATS & OILS PROCESSING

Technology Upgrades in Oilseed Extraction Processes and Developments in Value Addition

TA3

Mr. Biju George Palayil
CEO, Kumar Metal Industries Pvt Ltd, Thane, India

An overview of the use of extruders in the mechanical extraction and use of expanders with or without pre-press prior to solvent extraction of vegetable oils from various oilseeds compared with conventional methods in terms of Capital investments as well as saving in operational expenses like electricity & steam consumptions. Brief discussion about with the increasing need to feed humans, animals and fish more sustainably, expanding your oilseed product portfolio with plant based proteins is a forward-thinking strategy for our planet and your bottom line. Crown's proven Plant Protein Concentrate Process helps you achieve more margins higher than commodity oil and meal products.

ABOUT THE SPEAKER



Mr. Biju George Palayil
Kumar Metal Industries Pvt. Ltd.,
Thane

Mr. Biju George Palayil is the CEO of Kumar Metal Industries Pvt. Ltd., Thane. He is playing a role of diversifying the Kumar Metal product portfolio, spearhead business development and expand the company's footprint into newer geographies. Mr. Biju brings immense capability, with a formidable background in Marketing, Operations and Project Management going back 28 years. He is a Bachelor of Science (Tech.) with a specialization in Oil Technology from Nagarjuna University and an alumnus of the Indian School of Business in Hyderabad, where he was awarded as Masters in Business Administration.



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**Importance of Crude Oil Filtration before
Refinery and in Solvent Extraction Plant**

TA4

Mr. Sandeep S. Khadke

Managing Director, Sharpex Filters (India) Pvt. Ltd. Mumbai, India

Different crude oils like soyabean oil, sunflower oil, mustard oil and rice bran oil from expeller or solvent extraction plants (SEP) contain certain impurities which must be removed before neutralisation process. The removal of the suspended solids helps to avoid clogging of centrifuge bowl frequently, clogging of PHE's and to get food grade quality of lecithin. Normally the 'HIS' (Hexane insoluble + impurities) range from 0.3 to 0.6% in the crude oil. These impurities have to reduce to less than 0.1% to get the food grade quality of Lecithin. Conventional method of settling, decanters and pressure leaf filters with precoating are different techniques to get the required clarity in crude oil. The presentation will highlight the use of Horizontal pressure leaf filters for crude oil filtration along with other methods like miscella filters, disc filters for crude oil filtration.



ABOUT THE SPEAKER



Mr. Sandeep S. Khadke

Managing Director, Sharplex Filters
(India) Pvt. Ltd. Mumbai, India

Mr. Sandeep Khadke is the Managing Director of Sharplex Filters Private Ltd. He completed his Bachelors in Chemical Engineering from Mumbai University as one of the top rankers. He completed his certification in Piping Engineering from the prestigious Indian Institute of Technology-Mumbai. He joined Sharplex Filters in 2007 under the mentorship of his father Mr. Satish Khadke who is also the founder of Sharplex Filters. He underwent meticulous training and made sure that he understood the nuances of the business from grass root level. Mr Sandeep spent huge amount of time in all the important departments from inance to design and quality control to production. Mr Sandeep was eventually promoted to Managing Director and took the reins of the running of the company successfully into his hands. He has travelled extensively all over the world and has expanded the client base of the company in 90 countries. Today he is responsible for the overall working of the company and involved in important strategic decision making for the business. He is instrumental in maintaining the clientele and maintaining the highest production quality. In his leisure time he loves to travel and pursue sports



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**Mitigating 3-MCPD & GE Content in Edible
Oil: Latest Technologies & Innovations**

TA5

Mr. Ing. Daniele Mora

Technical Director, TECHNOIOLOGY s.r.l. Rome, Italy

3-MCPD and GE are the most challenging contaminants to be removed during edible oil refinery. Technology company provides a unique solution that can be implemented in any existing refinery plant to achieve a higher 3-MCPD and GE reduction as compared with std process route presently followed in the industry. This solution is so effective as to allow a high blending ratio which is reflected in a strong reduction in operating costs

The reactor is specially designed to mitigate processed oil mainly from palm, lauric oils, EIC-CIE product and even soft oils. Reactor designed to mitigate 3 MCPD level of 1-6 ppm feed, output guaranteed is around 0.25-0.35 ppm level. Reactor step is followed by washing and drying step and then the product is sent to post bleaching and post deodorizing section to lower the GE level down to 0.25-0.35 ppm. The presentation will highlight a special technology capable of drastically reducing 3-MCPD and GE in vegetable oils used for infant formula and food grade products.

ABOUT THE SPEAKER



Mr. Ing. Daniele Mora
M/s Technoology S.r.l.,
Rome, Italy

Mr. Ing. Daniele Mora is designated as Technical Director at M/s Technoology S.r.l., renowned European organization lead by Dr. Mario Bernardini. He secured his Bachelor's Degree in Chemical Engineering from Rome "La Sapienza" University. After initial work experience in the pharmaceutical industry, he joined Bernardini's flagship company in 2008, as start-up engineer. With the extensive practical experience in setting up processing units, he was elevated to lead Company's Process department as Process Manager. Presently, he is leading TECHNOLOGY's group offices in Rome, India and Malaysia as Technical Director. He is overseeing Basic, Detailed Process Design and of R&D departments. As a part of technology development to cater global Industry's needs, he is currently working on organic Chlorine removal from lipidic feedstock and pyrolysis oil and on 3MCPD mitigation or removal from crude and refined oil.





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Latest Developments in the Savour Cum in-House Regeneration of Energy for Fats & Oils Refinery

TAT

Mr. Riyaz Tunvar

Director (Marketing Operations), N & T Engitech Pvt Ltd. Chhapi, Gujarat

In the presentation two innovative solutions will be discussed for the benefit of oils and fats industry. The first one is a simplified caustic cleaning tank design for leaves' cleaning. Very user friendly method was developed with no hassles and bringing down CIP time and caustic consumption by half. The second innovation is design of energy savour cum generator for regeneration and in-house generation of energy by using various heat exchange combinations. For a 50 tpd plant the savings are about Rs 36,000 per day or Rs one crore for a period of 300 days' working.

ABOUT THE SPEAKER



Mr. Riyaz Tunvar

Director (Marketing Operations),
N & T Engitech Pvt Ltd. Chhapi, Gujarat

Mr Riyaz Tunvar was born on 01/05/2002. He completed his mechanical engineering diploma from GPP college Palanpur in 2020. Worked as Marketing Manager in N&T Engitech till 31.10.2022. Has been working as Director Marketing operations since 01.11.2022.



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**Innovative and Cost Effective Refining Processes for
Meeting Quality Compliances of Vegetable Oils**

TA6

Dr. Amol J. Gore

Manager (Process Technology), Muez Hest India Pvt. Ltd. Mumbai

Stringent regulations and increasing consumer awareness on nutritional quality of vegetable oils demand more sustainable and energy-efficient processes with lower OPEX for producing high quality oils with better yields. Conventional technologies with higher plant capacities increase OPEX and result in lower yields due to various operating reasons. The CAPEX for new technologies is slightly higher, but it gets compensated within one year through lower OPEX and improved yields. Hence, there is a need to develop and implement innovative refining techniques, viz. low labour, improved operability, and installation of multi-feed plants. In this scenario, physical refining is preferred over chemical refining with effective bleaching operation and more advanced deodorization and storage for producing high quality oil with good shelf life. The innovative bleaching techniques with diversified adsorbents (neutral/activated Cl₂-free clay, silica, activated carbon, etc.) under a high vacuum at a moderate temperature and time efficiently remove impurities (colouring pigments, phospholipids, oxidation products, metal traces, etc.) and avoids oil damage through oxidation and polymerization. Novel deodorization interventions include perfect dual-temperature using a high vacuum system efficiently removes odoriferous compounds and FFA, lowers energy consumption (steam) for the production of quality oil by retaining higher quantities of phytonutrients with insignificant generation of toxic contaminants like trans-fat, 3MCPD and GE. The resultant deodorizer distillate contains high FFA ($\geq 90\%$) content. The final cooling with heat exchangers gives maximum heat recovery and reduces oil oxidation (zero peroxide value). These interventions potentially increase yields, saving costs, zero liquid discharge (ZLD), and maintains the nutritional quality of the oil.

ABOUT THE SPEAKER



Dr. Amol J. Gore

Muez Hest India Pvt. Ltd.
Mumbai

Dr. Amol. J. Gore is currently working as the Manager, Process & Technology at M/s. Muez Hest India Pvt. Ltd. Mumbai. He obtained his bachelor's degree in Food Technology from MIT College, Pune. After completing his M. Tech. from UICT, Jalgaon, he obtained his Ph.D. (Tech) in Chemical Engineering from ICT (formerly UDCT), Mumbai. During his Ph.D., he worked on the utilization of edible oil refining waste and new process development. Dr. Gore was the recipient of the prestigious Prime Minister Research Fellowship for doctoral research, Govt. of India in collaboration with Marico Ltd. He worked on developing methods for identifying, quantifying, and extracting phytonutrients from vegetable oil deodorizer distillates. He has experience in vegetable oil extraction, refining, oleochemical, analytical laboratory, waste utilization, and new process development. He is currently looking for new projects and process development based on idea-to-commercialization concepts and research backup for problem-solving in the commercialized plants in vegetable oil and allied products.



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Scientific and Emerging Trends in Process Lines from Cottonseed to its Oil and its Value-added Products.

TA7

Mr. Jenendra R. Bohra

Executive Director, Ferro Oiltek Pvt. Ltd. Thane, India

Cottonseed is processed globally by the traditional methods by directly crushing the seed without “scientific process technology”, to yield around 10% and further 8% residual oil left in cake. High residual oil containing cottonseed cake is not required by the animals but ironically much in demand because of misconception among the dairy industry. However, the cottonseed meal obtained through scientific methods contains negligible oil. Hence, focus is totally based on the need to implement scientific processes, especially for cottonseed to improve the oil yield and obtain value added products.

Pre-Nitrogen Miscella Refining Process emerged as the most economical technique, especially for cottonseed oil. Advantages over conventional refining are as follows: i. Best process for mitigating expeller from process and let cottonseed process in single stage extraction without compromising with color of Oil; ii. Making easy separation of Soap from Miscella due to greater density difference; iii. Greater yields of refined oil per ton of cottonseed due to online refining; iv. More effective removal of FFA due to higher conversion of reaction, resulting lower refining loss; v. With very high difference in Oil-Soda contact we don't need washing stage, which not only saves water but also saves the cost of wastewater treatment plant, results in Energy Saving.

Advanced Scientific Process for Cottonseed includes Seed cleaning, Delinting, Decorticating and Hulls separation techniques and the Refinements in Process are aimed to obtain better yield and managing economics.

- i. Low Power Consumption significantly using high torque mechanism in main drive system in delinter from 73 HP to 54 HP.
- ii. Indigenous developed software for calibrated feed system by logical controller and drive system. To mitigate operator interference from operations.
- iii. Optimized pneumatic system incorporated in line with minimum power losses and efficient flow of material.
- iv. Specialized fabrication techniques like cold working over body plates improving the stability and life of machine without disturbing the physical and chemical properties of material
- v. Higher accuracy of helix angles with improved cutting edges on Decorticator knives improve the life of knives along with higher productivity.
- vi. Highly efficient delinting and decortication, not only provides value added cotton linters but also ensure oil left in hulls below 1.5% consistently.

vii. Removing Linters through Delinters will improve the efficiency of further processes like Cooking, Flaking, Expanding, Percolation and De-solventizing Toaster.

Refinements in Advanced Pre-N₂ Miscella Refining are as follows:

i. Developed PID Controlled System to Maintain Constant Concentration of Desired Hexane to Oil Ratio in Homogenizer.

ii. Intelligent Inline Alkali dosing system with sampling of input feed and dose stoichiometric requirement of alkali to make a uniform reaction in continuous operation.

iii. Enormous work has been done on design, R&D, to develop Special Disc Stack Centrifuge specially designed for Miscella Refining Application.

iv. Close loop N₂ Sealing System has been designed while in operation to form a nitrogen seal, which minimizes the nitrogen consumption and makes an efficient inertization to various points.

v. Smart Nitrogen dosing system Analyze the O₂ in loop with highly accurate Galvanic Sensors and start fluxing N₂ to Mitigate O₂ from Loop.

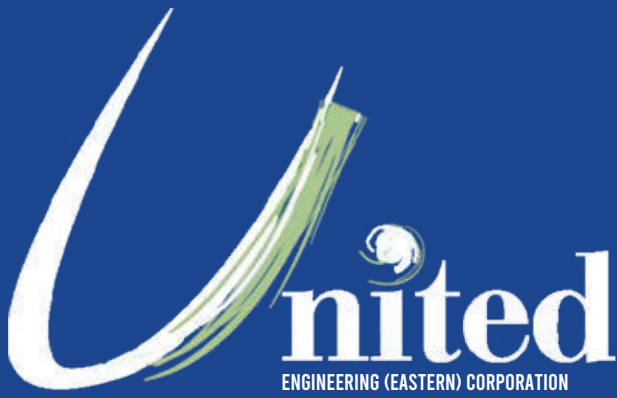
ABOUT THE SPEAKER



Mr. Jenendra Bohra

Executive Director,
Ferro Oiltek Pvt. Ltd. Thane.

Mr. Jenendra Bohra is the Executive Director of Ferro Oiltek Pvt. Ltd, Thane, India and also Technical Director of Fit N Fine Co. Ltd. Phichit, Thailand. He obtained Bachelor of Technology in Chemical Engineering from University Institute of Chemical Technology, North Maharashtra University, Jalgaon. Mr Bohra has 12 years of technical and entrepreneurial experience. He is leading in technology-centric departments to become outstanding contributors and skilful at uniting educationally and geographically diverse teams toward achieving singular goals. Mr Bohra is responsible for enhancing operational direction and organizational efficiencies in his organization with a strategic outlook. He has developed innovative sales and marketing strategies to facilitate business expansion. He has implemented several new technological improvements in the area of oils and fats. Mr Bohra is affiliated to several organizations like All India Cotton Seed Crushers Association The Solvent Extraction Association of India, Indian Institute of Chemical Engineers, Oil Technologist Association of India, Indian Merchant Chambers, Engineering Export Promotion Counsel and Trade Promotion Council of India



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Innovations in Rice Bran Oil Processing and Related Products - A Journey from Prototype to Scale Production

EN8

Dr. PP Chakrabarti

Chief Scientist & Head, Centre for Lipid Science & Technology,
CSIR-Indian Institute of Chemical Technology, Hyderabad

Dr. R B N Prasad

Former Chief Scientist & Head, Centre for Lipid Research, CSIR-Indian
Institute of Chemical Technology, Hyderabad

Rice bran oil (RBO) is considered as the most nutritious oil as it contains a host of minor constituents such as gamma oryzanol, tocotrienols, tocopherols phytosterols, steryl esters and squalene with proven nutritional benefits. It has a balanced fatty acid profile closer to recommendations of many health organizations. A number of scientific studies have attributed the cholesterol lowering properties and other health benefits of RBO to the unique nutrients of RBO and nutritional properties of these components.

RBO differs from other vegetable oils because of its higher content of free fatty acids (FFA) along with unusually high content of wax, unsaponifiable constituents, and polar lipids like phospholipids and glycolipids and coloring materials. During 1960s only five rice bran oil solvent extraction plants were existing and the first chemical refining plant was established for the production of Grade 2 RBO for soap manufacture. During 1970s RBO production reached about 50,000 tpa. Government of India provided incentives in excise duty for using RBO in the manufacture of vanaspati during 1980s. In 1986, standards for refined RBO were introduced by Indian food laws. By 1995 about 2 lakh ton per year RBO was produced and out of this 50% of RBO was consumed for vanaspati and the remaining for non-edible applications. The majority of the nutritional components present in rice bran oil are being destroyed or removed during traditional alkali refining in addition to huge processing oil loss compared to physical refining. Hence, chemical refining did not sustain and physical refining was introduced during 1990s. Industry struggled for a degumming technology to achieve < 5 ppm phosphorus, which is a pre-requisite for successful physical refining. There were lot of processing challenges for rice bran oil and it was a night mare for industry to process the rice bran oil prior to 2000. In 2001, CSIR-Indian Institute of Chemical Technology introduced enzymatic degumming technology to achieve <5 ppm phosphorus (high quality RBO with higher profits). Govt. of India supported IICT's technology under the programme of Technology Mission on Oilseeds, Pulses and Maize (TMOP&M).

Today India is producing ~11 lakh tons of high quality RBO from about 3 lakh tons of low quality dark colored RBO in 2000. This happened due to Govt's intervention and CSIR-IICT's innovative technology along with the support of Industry. TMOP&M provide grant-in-aid of Rs 75 lakhs each for motivating for establishing/upgrading 50 tpd refinery to 15 industries for implementing IICT's enzymatic degumming and fine tuning of dewaxing technologies in the country. In addition another 5 clients have taken this technology directly from CSIR-IICT. This process ensures a residual phosphorus level of less than 5 ppm after bleaching and dewaxing of enzymatically degummed RBO, which has made physical refining of rice bran oil a success. Later several RBO refineries started implementing enzymatic degumming technology and today a minimum 70% of the total production of RBO is produced using enzymatic degumming technology. A journey of CSIR-IICT's prototype process to commercial scale technology was a wonderful collaborative experiment involving number of stakeholders to make this a successful story for the country. CSIR-IICT's innovative interventions for RBO processing helped the industry to master the RBO physical refining process and today India has become a role model for the world for the production of high quality of RBO. In addition, CSIR-IICT developed technologies for lecithin, lyso lecithin, wax, triacontanol from rice bran oil processing by-products. Enzymatic degumming is one of the most successful stories of Indian vegetable oil industry in recent times and the presentation describes CSIR-IICT's innovations carried out in rice bran oil processing and related products.

ABOUT THE SPEAKERS



Dr. P P Chakrabarti

Chief Scientist and Head, Centre for Lipid Science and Technology, CSIR-Indian Institute of Chemical Technology, Hyderabad

Dr. PRADOSH PRASAD CHAKRABARTI, is currently working as Chief Scientist and Head, Centre for Lipid Science and Technology, CSIR-Indian Institute of Chemical Technology, Hyderabad. He is an Oil Technologist by training and obtained his Ph. D. (Technology) degree from UDCT, Mumbai (Presently ICT). After a brief stint of 2 years as a lecturer at UDCT, Mumbai he went to Hyderabad and joined CSIR-IICT. He has around 45 publications and 16 patents in his credit.

He, along with his colleagues, developed environment-friendly enzymatic degumming technology for rice bran oil that helped the industry to produce very good quality edible rice bran oil. This patented technology was transferred to 29 industries in India. He has developed processes based on membrane separation techniques for the treatment of different types of industrial wastewater. He has also developed processes for value addition of by-products of oils and fats refining industries including various processes for isolation of nutraceuticals. Another area of his expertise is supercritical carbon dioxide extraction of oils and fats.

He is the recipient of prestigious awards like Technology Development Board's National Award for the Best Commercialized Indigenous Technology, Industrial Green Chemistry Award of Newreka Green Synth Technologies and Green Chemistry Network Centre of American Chemical Society, CSIR Technology Prize in Chemical Technology, RBGV Swaika Award, G S Nivetia Award, Prof. R K Khanna Memorial Award and O P Narula Technology Award and also the most coveted Prof. J G Kane Memorial Award of OTAI. He was the Editor of Journal of Lipid Science and Technology from 2012-2015. He is a member, Scientific Panel of FSSAI on Oils & Fats and a member of FAD 13 and FAD 26 of Bureau of Indian Standards.

ABOUT THE SPEAKERS



Dr. R B N Prasad

Former Chief Scientist & Head,
Centre for Lipid Research, CSIR-Indian
Institute of Chemical Technology

Dr R B N Prasad was the Former Chief Scientist and Head of Centre for Lipid Research at CSIR-Indian Institute of Chemical Technology, Hyderabad, India. Dr Prasad is a highly distinguished Lipid Scientist and made outstanding contribution in areas of lipid chemistry and technology for over 45 years. Dr Prasad was the Former Chairperson of Scientific Panel on Oils and Fats, and also Former Member of Scientific Committee and Additives Panel of Food Safety and Standards Authority of India (FSSAI), Govt of India. Dr Prasad has contributed significantly for the Indian Mission on trans-fat reduction in the food sector. He is also part of Technical Expert Consultation Committee of WHO for the reduction trans fatty acids in foods. Dr Prasad has to his credit over 275 original research papers in reputed scientific journals, 22 book chapters and about 71 Indian and international patents in addition to transfer of technologies to several industries. He has delivered more than 250 invited lecture at National and International conferences. He is part of several expert committees of CSIR, BIRAC, DBT, DST etc. Dr Prasad was the National President of Oil Technologists' Association of India and Association of Food Scientist & Technologists (India). He has received several awards and notable among them are: VASVIK Industrial Research Award, Technology Development Board's (of Department of Science & Technology, Govt of India) National Award for Best Commercialized Indigenous Technology, CSIR Technology Award, BHU Centennial Award and Industry Medal Award of Biotech Research Society of India, etc., Dr Prasad is Fellow of Royal Society of Chemistry (UK), Biotech Research Society of India, Indian Society of Oilseed Research etc. He is presently Associate Editor of Journal of Food Science & Technology (Springer). Most of Dr Prasad's research contributions have been useful for the modernization of Indian vegetable oil and allied product industry leading to national prosperity. Presently he has been mentoring several Industries for their R&D activities



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EN9

Part A

Enzymatic Hydrolysis of Diglycerides in Refining and Modification Process for Better Oil Quality

Mr. Yee Hon Seng

Industry Technology Manager, Novozymes, Malaysia

High free fatty acids in crude edible oil occurs when triglycerides are hydrolyzed by an action of lipase, heat and moisture. The breakdown of triglycerides will generate free fatty acid and diglycerides. Free fatty acid can be removed by subsequent chemical neutralization or physical refining process. However, the extra diglycerides generated is not removed from the deodorization step.

Glycidol esters (GE) is known to be a genotoxic and carcinogenic. Europe impose a GE of 1ppm max in edible oil since 2018. Diglycerides is the main precursor for GE formation. Crude palm oil and crude rice bran oil is high in free fatty acid and diglycerides content in general. Crude rice bran oil contains 5-10% free fatty acid and 6-9% diglycerides. If an enzyme process can reduce the diglycerides level down to 2-3%, it will help to minimize the GE formation in the deodorization step. Dewaxing and winterization process are required to produce a better cold stability rice bran oil. Some of the higher melting point diglycerides will crystallize out together with the waxes and high melting point triglycerides. By removing some diglycerides with enzyme during the degumming process, this could potentially improve the oil yield due to less oil entrapment in the dewaxing and winterization process.

With enzymatic solution, both diglycerides and monoglycerides can be hydrolyzed to free fatty acid with minimum water present. With less water present, there is no triglycerides being hydrolyzed. This liquid enzyme also not causing any interesterification reaction. With that, it is specific to hydrolyze diglycerides and monoglycerides. We can also apply the same enzymatic solution into the enzymatic degumming of rice bran oil. This will help to reduce the phosphorus content as well as the diglycerides content in enzyme treated rice bran oil.

Part B
Process Innovations for Sustainable Oleochemicals Production
Using Enzymes

Mr. Rohit A. Bangera
Business Development Manager, Novozymes South Asia Pvt Ltd.,
Bengaluru, India

Enzyme processing is transforming the oils and fats processing industry, with more than 200 plants worldwide using state-of-the-art enzyme technologies to improve yields, quality and sustainability. Consumer demand for high purity and environment friendly cosmetics and nutraceuticals is expected to drive enzymatic processing in production of oleochemicals as well. This presentation will focus on how enzyme processes improve product purity, reduce energy & increase yields by avoiding formation of by-products during processing.:

Pre-splitting: High Pressure thermal splitting is an old and reliable process but highly energy intensive. The high temperature and long retention time in thermal fat splitting causes formation of by-products like trans fatty acids and polymers leading to yield losses.

Enzymatic splitting is commercialized for heat-sensitive feedstock like castor oil and in low-capacity plants. Using enzymes to pre-split the fat prior to thermal splitting eliminates the initial lag phase enabling faster hydrolysis thus increasing the capacity of existing thermal splitters to reach the same degree of splitting (DoS). In plant scale trials, following benefits were observed:

i). reduction in the process temperature thereby minimizing the formation of process impurities leading to improvement in product quality and yields and energy savings,
ii). decrease in the water required for splitting. By maintaining the existing throughput, benefits observed were: i). slightly higher DoS was observed, which translates to higher yield and ii). lower process temperature which prevents formation of by products like trans fatty acids & polymerization.

MCT: Limitations of chemical process like yield losses and complex purification process accompanied by sustainability demand opens an attractive opportunity space for innovation for new MCT production technologies. The enzymatic process with mild processing conditions delivers high quality MCT with simple purification translating into lower costs & energy and higher yields.

Other Oleo Applications: The presentation will also include high level examples on other innovations in enzyme applications in oleochemicals like full fat splitting, glycerolysis, esterification and sucrose esters

ABOUT THE SPEAKERS



Mr. Yee Hon Seng

Novozymes Malaysia Sdn Bhd,
Kuala Lumpur Malaysia

Mr Yee Hon Seng is the Industry Technology Manager, Novozymes, Malaysia. He has over two decades of experience in the Oils & Fats processing and related industries. Graduated from University Putra, Malaysia in 1999 as Food Technologist and began career as Chemist in Intercontinental Specialty Fats Sdn Bhd, managing the lab operation for QA/QC task for different plant including refinery, fractionation, hydrogenation, chemical interesterification, semi continuous deodorization, packing and margarine plant. Mr Yee Hon Seng joined Novozymes in 2004 with main focuses to provide technical support for customer to implement enzymatic process in their plant. He has vast expertise in different enzymatic process within oils and fats industry included enzymatic interesterification, enzymatic degumming, enzymatic biodiesel, enzymatic esterification, and others.

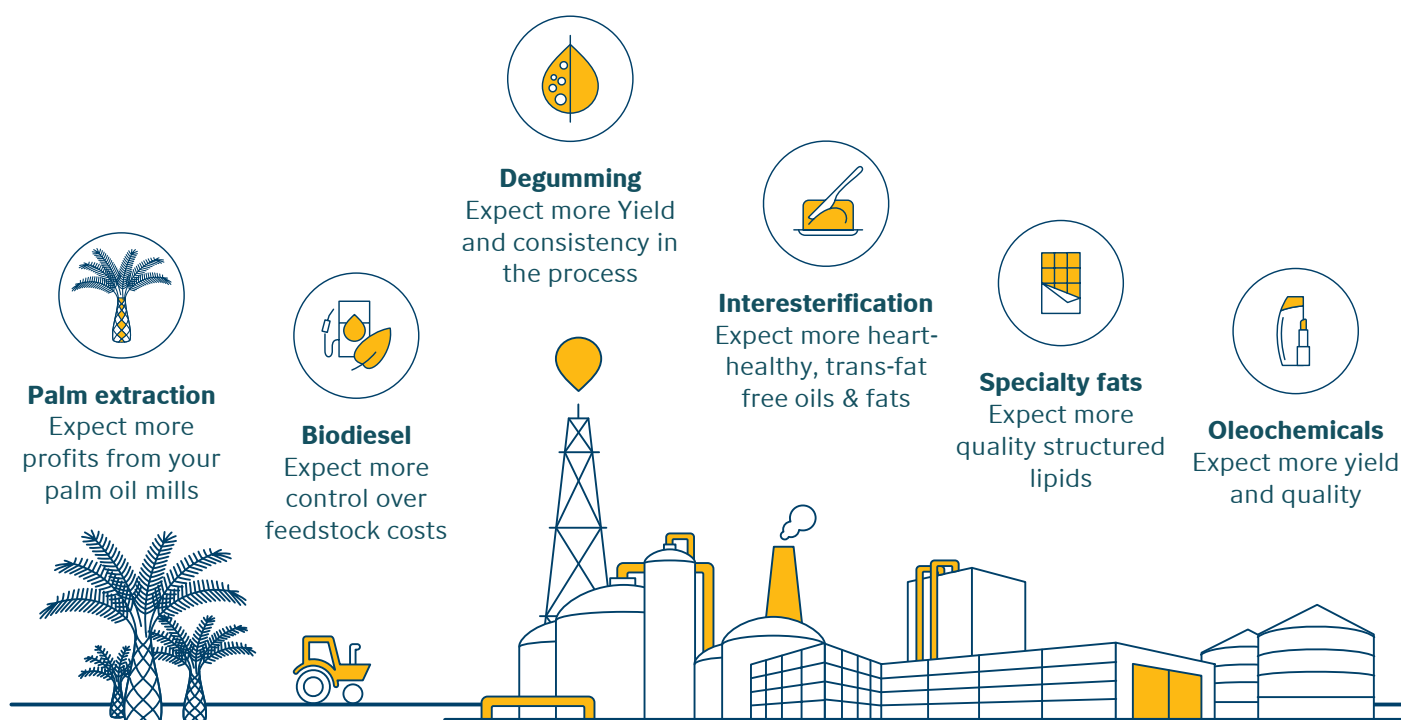


Mr. Rohit A. Bangera

Novozymes South Asia Pvt. Ltd.
Bengaluru

Mr Rohit A Bangera is presently Business Development Manager at Novozymes South Asia Pvt. Ltd. Bengaluru. He has over two decades of experience in the Oils & Fats processing and related industries and at present he is developing enzymes application across the Oils & Fats value chain including extraction, refining, fat modification, specialty fats, oleochemicals and biodiesel. Mr Rohit graduated from UDCT (now ICT), Mumbai in 1999 as Oil Technologist and began career in R&D in Ricinash Oil Mill, developing products based on castor oil. He was also associated with Engineering companies namely Desmet Ballestra and DVC Process Technologists for almost 17 years in the Sales & Marketing function and worked on standardization of sales process and part of the team to introduce new technologies to India. Made various presentations on Indian & international forums.

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Enhanced Quality & Profitability for Soft Oils Refining

EN10

Dr. J. Sambasiva Rao

Managing Director, Shirdi Sai Nutraceuticals Pvt Ltd, Bengaluru

In refining of Soft Oils, quality considerations drive the choice of refining method. Though the current refining methods deliver satisfactory quality most of the times, they do through up unwanted challenges such as thin refining margins due to high losses, environmental issues such as effluent and acid fumes and further room for quality enhancement. The root causes of these issues appear to be the phospholipids present in the oil and the neutralization technique(s) being employed.

Here is a solution to above issues wherein, the above issues are eliminated by addressing the root causes as follows.

1. Enzymatic Hydrolysis of Phospholipids: Phospholipids can be COMPLETELY hydrolysed to glycerol phosphate by using a combination of phospholipase and lyso-phospholipase. Glycerol phosphate being totally hydrophilic in nature, it can not carry any oil with it while going out of oil. Thus, elimination of phospholipids from the oil will reduce oil losses either in physical or in chemical refining. In case of chemical refining, elimination of phospholipids before neutralization offers several benefits such as reduced neutral oil carry over in to soap, easier and milder processing of soap, better quality of oil recovered from soap, reduced effluent etc.

2. Neutralization Technique: In traditional neutralization, the soap content of neutral oil is very high ranging from 400 to 2000 ppm depending upon type of centrifuge used and the phosphorous content of neutral oil too is high ranging from 12 to 18 ppm. In the present solution, the enzyme reacted oil is neutralized with stoichiometric quantity of caustic and soap is separated at 75°C. The presence of aqueous phase during neutralisation enables more complete separation of soap as well as glycerol phosphate and hence the neutral oil has very low soap content of 125 – 400 ppm and phosphorous levels of 3-4 ppm.

The following are the deliverables of the process: i. Enhanced Profitability as compared to traditional neutralization; ii. Use of stoichiometric quantity of caustic for neutralization; iii. Lower neutralization losses; iv. Easier recovery of oil from soap; v. High Quality oil recovered from soap; vi. Zero ppm phosphorous and soap in bleached oil; vii. Reduced effluent generation; viii. Reduced energy and chemical consumption in soap splitting and oil recovery from soap; ix. Elimination of water wash post neutralization.

The process is highly profitable as the economic value generated in the new process is much higher than the additional cost of enzyme treatment.

ABOUT THE SPEAKER



Dr. J. Sambasiva Rao

Shirdi Sai Nutraceuticals Pvt Ltd,
Bengaluru, India

Dr Sambasiva Rao Javvadi is the Founder Managing Director of Shirdi Sai Nutraceuticals Pvt Ltd. Bengaluru. He completed his B. Sc (Tech) and Ph D (Tech) in Food Technology from Institute of Chemical Technology, Mumbai (Formerly UDCT). Dr Rao has more than 30 years of experience in technical sales, business development and solution development of industrial enzymes to various segments of user industries in India and South East Asia giving more thrust to "Enzymatic Solutions to Oils & Fats Processing". His contributions are significant for several industrial biotechnological processes namely enzymatic degumming of vegetable oils involving several enzymes including Lyso-phospholipase, Enzyme-assisted Palm Oil Extraction and Enzyme-assisted Kachi Ghani Mustard oil Extraction. Recently Dr Rao has developed a novel "Enzyme-assisted Chemical Refining of vegetable oils" for which a patent has been granted in India. Dr Rao has founded Shirdi Sai Nutraceuticals Pvt Ltd in 2012 which is now focusing on development, manufacturing and marketing of nutraceutical fats, cosmetic esters and enzyme based solutions for oils & fats processing.

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- Dry Fractionation of Palm Oil
- Hydrogenation
- Fat Splitting / Fatty Acid Distillation / Glycerine Distillation
- Bio Diesel
- Interesterification
- Glycerolysis
- MCT from Coconut Oil and PKO
- Bakery Shortening & Margarine
- Lecithin
- Tocotrienol and tocopherols
- Soap Stock Splitting
- Mecklear Gravity Filter for Dewaxing / Winterization and Wax Filtration

Application of Ultra-scientific Tools for the Quantitative Detection of Adulteration in Edible Oils and Fats

FS11

Dr. R D Kulkarni

Sr. Professor, Institute of Chemical Technology, Mumbai

Edible oils and fats, which chemically comprise major (triacylglycerols) and minor (sterols, carotenoids and tocopherols) components, have economical and nutritional benefits. These oils offer nutrients that are essential to human health and are used in home cooking and industrial food manufacturing. However, the oils and fats are the frequent subjects of adulterations in which the higher priced quality oils are mixed with lower cost inferior oils to enhance the profits and deceive the consumer. Admixing cold press oil with refined one represents another area of adulteration. Besides the commercial angle, the adulteration in edible oils can cause several problems and fatal effects on consumer health. Some of these effects may lead to death. Thus, the oil adulteration has been a chronic issue for many years. The correct identification of oils is, therefore, important to consumers from both commercial and health perspectives.

To detect edible oils and fats adulteration, it is possible to use both major and minor components of oils as detection tool. Since each oil and fat may have a specific/unique component at a known level, their presence and amounts should be considered as a detection tool. Among the established methods for the control of authenticity of oils, gas chromatography and liquid chromatography tools are used more frequently. By all these techniques, certain compounds contained in oils (fatty acids, triglycerides, trilinoleins, tripalmitins, tocotrienols or tocopherols) are detected, analysed and used for the authentication of virgin oils. Analysis of the fatty acid profile of an oil after methylation by gas chromatography coupled to flame ionisation detection (GC-FID) is a well-established method for the quantitative authentication of edible oils and fats. This technique detects adulteration by comparing the retention times and peak areas of the fatty acids against appropriate standards. A comprehensive list of fatty acids with various carbon lengths and degrees of saturation has been compiled by Codex Alimentarius Commission (CODEX, 2009). UV spectroscopy based on absorptivity in the regions of 208-210 and 310-320 nm has been widely used to detect adulteration of virgin with refined olive oil. Reversed phase HPLC analysis of the triglycerides and fatty acid composition is also widely used to detect the adulteration in oils and fats e.g., detection of olive oil adulteration with canola oil. Green et al.

have recently developed a relatively fast, one-hour detection approach for the authentication of extra virgin olive oils based on the direct analysis of triglycerides using ultra-high-performance liquid chromatography (UHPLC) coupled with charged aerosol detection (CAD) (Food Control, 107, 106773, 2020). The operational specifications of GC and HPLC techniques and the interpretation methodologies used to detect the adulteration in edible oils and fats are delineated in detail.

Authentication of oils and fats is becoming a major challenge in food analysis as adulterations are getting more sophisticated today. Chromatographic methods require time-consuming optimization and extraction of specific classes of compounds for the accurate analysis of complex mixtures through the skilled operators. In addition, some investigators have reported that the determination of fatty acid patterns of oils and their admixtures cannot be used as reliable basis for determining the oil purity as the fatty acid compositions of oils and their binary and ternary admixtures could hardly be differentiated and accordingly, it was not easy to establish oil purity on such a basis. Hence rapid, accurate, reliable and robust analytical methodologies based on ultra-scientific tools are required for vegetable oil authentications. Thus, the potential of Fourier Transform Infrared (FTIR) and Nuclear Magnetic Resonance (NMR) analysis as well as Raman, GC/MS and Fluorescence Spectroscopic Techniques need to be explored for the discriminating characterization of oils and fats for classification, prediction and detection of adulterations. Taking NMR analysis as an example, we understand that ^1H NMR spectra provide information on major compounds such as fatty acids and also on minor compounds such as aldehydes, terpenes and sterols. ^{13}C NMR is a technique that is capable of characterising vegetable oils according to the acyl positional distribution in the glycerol moiety. The recent introduction of multivariate statistical methods such as partial least square (PLS), principal component analysis (PCA), and discriminant analysis in conjunction with the use of these ultra-scientific tools has opened up new frontiers in analysis. For example, the mid-IR spectra of most vegetable oils are superficially similar and dominated by the C-H and C-O vibrations of the polymethylene chains. Hence the mid-IR region has not been used for the detection of adulteration in oils. However, the subtle dissimilarities between spectra of oils do exist, due to the differences in the structure of the polymethylene chains. With due utilisation of multivariate statistical methods, the great wealth and variety of information about the composition of the oil sample carried in its spectrum can be extracted to form the basis of differentiation of different oil types. Successful discriminant analysis is the first step toward producing a method that not only correctly classifies but also reliably detects adulterated samples.

To produce a reliable robust method, the database of samples and spectra must be increased considerably. For example, the PCA models built with ^1H NMR and GC/MS data by G. Fang et al. have distinguished between various types of oils and fat (Food Chemistry, 138, 1461–1469, 2013). The use of fingerprinting using various ultra-scientific tools techniques in combination with chemometrics to build the database for the verification of geographic origin, the discrimination of different grades of oils, the detection of adulterants in oils and classification of oils and fats by different investigators over last decades have been presented.

With the advent of Industry 4.0, Machine Learning Algorithms have facilitated the numerous breakthroughs in the processing of complicated data sets. Raman spectroscopy has been used to characterize the chemical composition of bulk lipids, determine the free fatty acid content and the degree of unsaturation of oils, and discriminate between and authenticate different edible oils and fats. However, the difference in Raman spectra between oils is elusive; therefore, it is necessary to apply statistical analysis to accurately and efficiently identify these unique spectral differences. H. Zhao et al. have developed a protocol that combined machine learning algorithms with Raman spectroscopy for the authentic characterization of edible oils based on fatty acid composition (Food Chemistry, 373, 131471, 2022). This approach may be used to establish rapid on-line or offline platforms for the analysis of edible oils adulterants.



ABOUT THE SPEAKER



Dr. R D Kulkarni

Sr. Professor, Institute of Chemical Technology, Mumbai

Prof Dr. R D Kulkarni is Senior Professor at Oils, Oleochemicals, and Surfactants Technology, Institute of Chemical Technology (ICT), Mumbai, India. Prior to this, he was Pro Vice-chancellor of the University of Mumbai, Professor and Head, Dept. of Oils, Oleochemicals, and Surfactants Technology, ICT). He also held the position of Professor and Head of Paint Technology and Director at UICT, North Maharashtra University, Jalgaon. Prof Kulkarni has over 30 years of teaching and research experience in the Chemical Technology area. Prof Kulkarni is working in the fields of Renewable Polymers, Nanopigments and Green Functional Paints; Oleochemicals, Surfactants, and biolubricants. His research is based on combining the green approach and ultra-scientific tools to track the chemical and physical transformations brought out by surfactant-mediated protocols. He has guided over 17 doctoral students, two postdoctoral and 58 M Tech degree students. He has published about 80 original research publications in reputed journals and six book chapters. He has three granted and four filed patents to his credit. Prof Kulkarni executed more than 25 basic and industry consultancy projects with substantial amounts of funding. He has also executed several Infrastructure Projects (DST -FIST, UGC SAP, MODROB, TEQIP-II) with a grant of about Rs 15 crores. Prof Kulkarni received several awards and recognitions such as UAA-ICT Distinguished Alumnus Award - Academic's, Prof. J. G. Kane Memorial Award of OTAI, Fellow of Maharashtra Academy of Sciences, Elected Life Fellow of Indian Chemical Society, Best Teacher Award, Best Paper Award in 2006 by JOCCA Surface Coating International, etc. He has widely travelled to Singapore, Germany, Thailand, Indonesia, Netherlands, France, Switzerland, Japan, Mauritius, and Russia for Conference Presentations, professional interactions, and visits to various Universities. Prof Kulkarni delivered more than 70 Invited Talks and 150 Conference Presentations. He has significant experience in handling Quality issues, Assessment, and accreditation-related practices of NAAC; NBA, and NIRF. Prof Kulkarni provided his expert guidance to several universities as chairman or member of academic and administrative contributions like Member-Senate, Board of Research, Academic Councils, Executive Councils etc.



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Uncovering the Hidden Hazards: Mastering the Testing of Edible Oils for Harmful Compounds

FS12

Mr. Wim Broer

Science and Development Manager, NofaLab, Schiedam, Netherland

The presentation will cover the trends of contaminants since the 1990's (pesticides) until now with more thrust to MOSH/MOAH and 3-MCPDE and GE along with a brief on the mitigation of these contaminants. The available current methods on determination of MOSH, MOAH, GE and 3-MCPDE are discussed. MOSH and MOAH has 2022 modified EN 16995 standard method. 3-MCPDE and GE has eight valid methods for determination (both ISO and AOCS). All methods are briefly compared regarding ease of use and results obtained.

ABOUT THE SPEAKER



Mr. Wim Broer

Science and Development Manager,
NofaLab, Schiedam, Netherland

Mr. Wim Broer is the Science and Development Manager at NofaLab, Schiedam, Netherlands in the field of food and feed safety. He has worked for over 35 years in environmental, food and feed safety laboratories. He has worked as a scientist, quality assurance manager and laboratory manager. Mr Wim has extensive experience in analytical chemistry, especially inorganic and organic analysis of food, feed and environmental samples. He has developed methods for liquid and gas chromatography, GCMS, LCMS and ICP(MS). He ran an inorganic and organic analysis laboratory for more than 15 years. Wim has worked for DCMR, Alcontrol and IWACO in the field of environmental analysis. Since 2009 he has been working as Science and Development Manager at Nofalab, which is a part of the Cotecna group.



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Importance of Regulations for the Quality and Safety of Edible Oils & Fats

FS13

Dr. Prabodh Halde

Head, Regulatory, Marico Limited, Mumbai, India

Today, food production involves risk management, and this risk must be managed at all stages of the food chain, from farm to fork. All the stakeholders of a food chain including farmers and growers; manufacturers and processors; food handlers and consumers are responsible for food safety. Contamination can occur anywhere along the food chain and the worth of oils depends on their quality, nutritional aspect, and oxidative stability. It is necessary to take lot of care from the quality of raw material to the packaging of edible oils and fats for maintaining the quality. Good farming practices and the weather during the harvesting of the crops are most important to prevent the crop contaminants like mycotoxins, metal contaminants and pesticide residues. Adequate integration among expelling, solvent extraction and refining units may provide high quality edible oils and fats. Hence, the legislation which is making regulations has to ensure that consumers and fair traders are adequately protected. Over the years, the standards of Codex Alimentarius Commission and individual countries for oils and fats have been gradually modified to enhance their usefulness in tackling authenticity problems. By considering the importance of edible oils and fats in the common man's food, FSSAI is vigilant in providing safe oils and fats to consumers by introducing several crucial specifications like fatty acid composition, peroxide value etc. FSSAI has brought paradigm shift in the country by inspiring trust via assuring safe and nutritious food. In the fats and oils sector, there are recent advances which have helped industry at large. FSS (Prohibition and Restrictions on Sales) Regulation has brought various provisions which are as follows: Limiting industrial trans fatty acids, not more than 2% by mass of the total oils/fats with effect from 1st January, 2022; prohibition of Blended Edible Vegetable oils with mustard Oil; Total Polar Compounds in unused or fresh vegetable oil or fat shall not be more than 15% and used vegetable oil or fat having developed Total Polar Compounds more than 25% shall not be used. FSS (Food Product & Standards) regulation, has specified various new standards for oils such as avocado oil, palm stearin, palm kernel stearin, palm olein, palm super olein, chia oil, grapeseed oil etc. under appendix c, it has allowed various processing aids which are used by fats & oil industry at large. FSS (Advertising & Claims) regulation, gave allowance to list of positive claims for edible vegetable oils. FSS (Labelling & Display) regulation, has stated various provisions labelling, nutritional information, for multi-source edible oil, it has become mandatory declaration to write name of oil with percent by weight.

Font size for label declaration has also been specified. FSS (Fortification of Foods) Regulations 2018, has specified standards for fortified products and has mentioned fortified logo as well. For considering the safety of food and keep an eye on the contaminants, FSSAI has also started working in consultation with the scientific community and other stake holders on the testing of 3-MCPDE and Glycidyl esters in edible oil. In order to boost indigenous minor seed oils, FSSAI is also working for framing the standards such as sal olein, sal stearin, mango kernel olein, mango kernel stearin, shea olein, shea stearin etc. The presentation provides an overview about the importance of regulations for the safety and quality of edible oils and fats. In order to bring transparency, Recent FSSAI order mandates the FBOs to upload or link mandatory Lab Testing Report [Six-monthly] on FoSCos.

Globally, Codex Committee on Fats & Oils (CCFO) formulates, worldwide standards for Fats and oils with an objective of protecting human health and ensuring fair trade practices. Codex Standard (CXS 210-1999): Standard for named vegetable oils' stipulates standards via providing description, essential composition & quality factors, food additives, covering food labelling, food contaminants etc. In addition to this, there are standards for edible fats and oils which are not covered by individual standards, 'code of practice for the Storage and Transport of Edible Fats and Oils' in Bulk etc. 'General standards of Food additives', 'General Standard for Contaminants and Toxins in Food and Feed' helps in laying out the values for additives, contaminants etc. Industry need to be in sync with regulatory requirements. 'Code of Practice (CXC 79-2019): Reduction of 3-Monochloropropane-1,2- Diol Esters (3-MCPDEs) and Glycidyl Esters (GEs) in Refined Oils and Food Products Made With Refined Oils' intends to provide national and local authorities, producers, manufacturers, and other relevant bodies with guidance to prevent and reduce formation of these contaminants. India being a land of diverse culture and food productivity, needs to definitely find newer ways to boost our Indian trade viz a viz sustainable and competent. With the advent of technology and to be at par with global regulations, Indian regulations should be continuously framed keeping in mind innovation, sustainability, keeping in mind, domestic need. Eg: More focus should be given on horizontal standards to achieve overall quality and safety competence in food chain, promoting indigenous oil/oilseeds should be encouraged to boost Indian trade, there should be allowance of more than two edible oils in multi-source edible oils, For Used Cooking Oil, there should be better collaboration and partnership between the food industry, regulators, collectors and aggregators and India's nascent biofuels industry on Used Cooking Oil (UCO) for Sustainable Ecosystem

ABOUT THE SPEAKER



Dr. Prabodh Halde

Head, Regulatory, Marico Limited,
Mumbai, India

Dr. Prabodh Halde is currently the Head, Regulatory at Marico Ltd., Mumbai, India. He has about 28 years of string industrial experience and worked for Bakeman, ACC and Coca Cola India. Presently, he is the Research Council member of CSIR-CFTRI, Mysore and IIFT, Tanjore. He represented India six times for Codex Meeting during 2012 to 2021. Dr Prabodh was the Past President of Association of Food Scientists and Technologists (India) and a renowned Food Technologist with a well-rounded and multi-disciplinary experience. He initiated number of innovative programs at AFST(I) namely Project Ashirwad, Project Avishkar, Project Power talk and Project Parampara and popularized at national level. He is the Chairman of Western Region for AIPFA India. He is also Executive Committee Member of PFNDAL and SEA, India. He is an active member of various industry associations like CII, FICCI, IBHA etc. He is part of the State Food Safety Committee for Gujarat Government. Dr Prabodh was the Member of Central Advisory Committee of FSSAI, Govt of India and Member of Niti Ayog Empowered Group as a representative of food industry. He is member of Sub-committee for Ayush Ministry for covid task group for framing Ayush covid guidelines. He is on various boards and renowned trainer in the area of food processing, food safety and startups. Dr Prabodh has a passion to nurture the young entrepreneurs and is mentoring over 25 food startups and in addition supporting and mentoring over 200 startups and students through Trusted group activity. Dr Prabodh is also part of Academic Boards of several colleges and universities. He is National resource person for FoSTaC programs of FSSAI. Dr Prabodh is an accomplished motivational and technical speaker and delivered more than 200 lectures at different national and international conferences on Food Processing, Quality and Safety. Dr Prabodh trained over 90,000 students/startups/industry representatives directly or indirectly through his 100 webinars and videos during COVID 19 pandemic. He wrote several books on Food Safety regulations for sectors such as the Oil industry, Bakery Industry and the Retail industry and these books have proved to be very useful guides for Food Business Operators. He also published series of motivational books 'Prabodhika' for students and recently the 5th Prabodhika was blessed by HE Shri Ramnath Kovind, Former President of India. As recognition of his expertise, Dr Prabodh was part of a PMO visit delegation to Tajikistan as a food industry expert in June 2015. Under Leadership Exchange Program, he visited USA for 21 days as food safety expert with the invitation from US State Department. Dr Prabodh is recipient of Globoil food safety award, AIFPA's Outstanding regulatory award, National food safety 'Eat Right Awards of FSSAI and special recognition award of ITC-FSCAN.

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MODULE 5 - KEY-NOTE LECTURES

D3PRO - A Green Clarification System: Best Oil Yield with Lowest Effluent Generation Coupled with in situ Mitigation of 3-MCPDE in Palm Oil Mills

KL14

Mr. Hong Boon Kheng

Global Sales Manager (Crude Palm Oil and Latex Application)
Alfa Laval Malaysia Sdn. Bhd., Malaysia

D3PRO is a modern palm oil mill clarification systems using decanters and high speed separators for production of high quality CPO coupled with lowest oil loss. It does away with the traditional large settling tank and the use of dilution water, thereby saving valuable floor area and at the same time, reducing the volume of waste water generated.

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ABOUT THE SPEAKER



Mr. Hong Boon Kheng

Alfa Laval Malaysia Sdn. Bhd.,
Malaysia

Mr. Hong, Boon Kheng is the Global Sales Manager for Crude Palm Oil and Latex application within the Alfa Laval's Food and Water Division and is located in Alfa Laval Malaysia Sdn. Bhd. in Kuala Lumpur. He graduated from Tunku Abdul Rahman College, Malaysia in 1989 and he has been with Alfa Laval for more than 30 years accumulating vast experience and knowledge on high speed separators, decanters and heat transfer technologies. His main focus is in the application of these technologies for improving the efficiency in the Crude Palm Oil milling industries.



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Mr. Sudhakar Desai

CEO, Emami Industries Ltd. Kolkata India and President, Indian Vegetable Oil Producers' Association (IVPA)

India has undertaken the strategic mission of Atmanirbharta in which Indian Vegetable Oil Industry is going to play an important role as India is dependent on imports to the extent of about 60-65% of India's huge consumption of about 22.5 million tons. The Ukraine crisis, Indonesian ban and increasing pressure on food inflation globally put India in a tight spot last year when prices were lifetime high.

Thankfully today, prices have retrieved by about 40 percent offering new opportunities in the Vegetable oil sector and we need to have a stable policy for consistent growth and moving target of a balance between farmers, consumers, industry, and allied sector and at the same time be able to work seamlessly with the Government.

What are the challenges in the industry and what are the opportunities in this space? The Rs 2.5 lakh crore Industry has an important role to play both internally and globally.

We must eventually embark on a clear national mission on oilseeds to improve our self-sufficiency in vegetable oil sector and allied Industry.

What role technology can play in meeting the production and productivity targets? What kind of policy issues need change? Don't we need a dynamic approach in the current volatile and complex era of commodity prices? There are many more key game changer questions for which debate and discussion is very important for a comprehensive conclusions and action plans in this one of the most critical Industries in food chain. The presentation addresses some of these issues.

ABOUT THE SPEAKER



Mr. Sudhakar Rao Desai

Emami Agrotech Ltd., Kolkatta,
India & President, IVPA

Mr Sudhakar Rao Desai is the CEO of Emami Agrotech Ltd., Presently he is also President of Indian Vegetable Oil Producers' Association (IVPA). Mr. Desai, a Management Graduate from IRMA (Institute of Rural Management), has over 35 years of experience in the agribusiness and international trade. He has risen up the corporate ladder with his sharp business acumen and expertise from starting as a Salesman to be an internationally acclaimed and accomplished CEO of a Rs 200000 Cr Company. Emami Agrotech Ltd has witnessed a 10 X growth during his tenure. Earlier, Mr. Desai was the Country Head/ Founder Director of an Agribusiness MNC called Bunge Ltd., USA. Prior assignment includes working as the Chief Trader at ITC Agrotech/ Conagra Ltd, USA. Additionally, he is acting as Chairman, Eastern Region Agri Council, ASSOCHAM (Associated Chambers of Commerce and Industry) and Food and Agri committee member of Indian Chamber of Commerce, Eastern Zone. He has served as Director of Bombay Commodity Exchange. He was actively associated with trade bodies like The Solvent Extractors' Association of India and had been in the product Committees of Domestic Commodity Exchanges. Mr Desai is a regular speaker at various national and international forums and the Indian commodity TV channels, on food and agri- sector. Due to his incisive analysis and deep knowledge on the subject, he is invited for sharing his expert views by various trade bodies and Governments alike. He is a recipient of the prestigious "Globoil Man of the Year Award in 2008" amongst many others.



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Ms. Aarti Chame

Chief Operating Officer, DVC Process Technologists, Pune, India

Many countries have pledged and many more would announce their pledge in the coming decade to achieve net zero emissions by 2050. Net zero emission focuses on technologies, processes, and other energy generating facilities which do not emit greenhouse and other wastes that can deteriorate the quality of the environment. Its transition should start with adopting technologies and processes that are highly energy efficient. Industries should identify the processes which are energy intensive and optimize it to make it energy efficient. Contribution of Oils and fats processing units with its energy consumption, conservation and emissions would be discussed, in which one can see how processes can be made energy efficient and its impact on carbon footprint by integrating the green energy resources.

This presentation will also discuss the various green energy resources, its availability and viability. Decarbonization must be ensured with cost-effective and productive pathways which shall result in a clean and resilient energy economy that will be dominated by renewable resources like solar and wind.

ABOUT THE SPEAKER



Ms. Aarti Chame

DVC Process Technologists,
Pune, India

Ms. Aarti Chame is the Chief Operating Officer of DVC Process Technologists, Pune. She was graduated from Laxminarayana Institute of Technology, Nagapur and postgraduated (MS) from Illinois Institute of Technology, Chicago in Chemical Engineering. Ms. Aarti was associated with The Nielsen Company in 2012 as an Analyst of FMCG market study. Later in 2013 moved back to India and got associated with DVC Process Technologists as HoD of Design, Engineering & Supply. She delivered several lectures on behalf of DVC on various platforms. She is member of American Oil Chemist Society (AOCS).



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**Decarbonisation across Energy Intensive Industries
and Imperatives for Vegetable Oil Industry**

EC17

Mr. Shardul Kulkarni

CEO, Deesha Power Solutions Pvt Ltd. Mumbai, India

Mr. Srinivasa Viswanathan

CEO, Vibrant Energy, Hyderabad, India

Today decarbonisation is getting addressed across energy intensive industries. Further, it will be our attempt to sensitize the audience about carbon tax being talked about across various nations including the "Cross Border Carbon Adjustment" tax as proposed by the EU and its implications for export oriented units. Further, we shall share case studies on Green Energy and Green Hydrogen across various industries and the benefits. The presentation will cover policy level initiatives for GE and GH2 in India. The presentation attempts to give a sense of the carbon market (under development) in India. We shall present structures under which such GE and GH2 projects are conceived in India. The presentation will provide with key learnings/imperatives for the Indian vegetable oil industry



ABOUT THE SPEAKERS



Mr. Shardul Kulkarni

Deesha Power Solutions Pvt Ltd,
Mumbai

Mr Shardul Kulkarni is MD & CEO of Deesha Power Solutions Pvt Ltd. He is an energy transition professional with about 21 years of experience in power and renewable energy. He facilitated investments in energy transition projects with cumulative investment of USD 1 billion+ across multiple geographies viz South East Asia and Western Africa. In the past, he worked with blue chip organisations like SBICAP, Crisil Infra, Singapore PE Advisory and Tata Strategic. Now he is advising multiple clients for their foray in GH2GNH3. Among others, he is associated as GH2 Expert for Vibrant Energy. He has been invited at many industrial events to share his unique point of view in the areas of Green Hydrogen, Net Zero, Energy Transition, waste to energy, Energy Efficiency & Managing Cost of Energy, ash management, coal gasification, etc. Further, Mr Shardul has authored 15+ thought leadership articles on various energy matters including GH2 and Energy Transition arena. In addition to this, he has a YouTube channel "Hydrogenwala" to spread awareness about green hydrogen and green ammonia to industry at large.



Mr. Srinivasan Viswanathan

Vibrant Energy, Hyderabad, India

Mr. Srinivasan Viswanathan is the CEO of Vibrant Energy, Hyderabad, a C&I platform owned by Macquarie's Green Investment Group. Mr Srinivasan has spent more than 15 years across the renewables ecosystem in markets ranging from the US, Europe, and Asia- in particular, India after stints in investment banking and technology services companies. After an energizing career in SunEdison where he led the C&I business, Mr Srinivasan took up the challenge of building Vibrant Energy as India's leading corporate renewables platform that empowers businesses with sustainable energy and sustainable fuels. Mr Srinivasan and his team grew the portfolio AUM from 65MW in 2021 to 1.2GW in 2022 + 3GW pipeline. He believes Vibrant Energy should be built on shared values of Integrity, Peak Performance, Empathy, Teamwork, and Mutual Respect, which has also helped him to achieve the Great Place to Work status for Vibrant Energy. He completed his MBA from Tuck School of Business at Dartmouth and graduation from University of Mumbai.



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MODULE 6 - ENERGY CONSERVATION: RENEWABLE AS WELL AS SUSTAINABLE

Solutions to Reduce Carbon Emissions in Effective Way in Oils & Fats Industry with Specialized Mass Transfer and IoT-based Technology

EC18

Mr. Chetan Sayankar

Managing Director, S Cube Mass Transfer Pvt Ltd. Pune, India

IoT is the way to sustain operations and energy efficiency. Nowadays most of the process plants are semi or fully automated with state of the art sensors and controls systems. However, these automation systems are not used to the full extent eg: Deviation in the distillation pressures or temperature can lead to reduced yield and hence more energy per liter of products processed. Deviation in vacuum levels leading to reduced solvent recovery leading to increased cost and emissions. This is where an innovative approach of coupling the existing sensors and automation systems with IoT will help to know the deviations in real-time basis and avoid potential loss or rejections and thereby enhance the plant productivity or energy efficiency. With our unique approach of need finding, cross domain expertise and data analytics we help small, medium and established plants to help sustain and improve their operations. This will give guidelines in energy saving and provide solutions to reduce carbon emission. Further to this approach we are coming up with the solutions, where we can convert the emitted carbon (Carbon capturing technology) to allied products like calcium carbonate etc. The presentation covers the following two case studies. In the first example, a turnkey project executed at Mexico will be presented in which effective way of solvent recovery helped to reduce capex and opex more than 30%. In the second example, a case study will be presented for carbon emission reduction for the oil and fat industry with the IoT system.



ABOUT THE SPEAKER



Mr. Chetan Sayankar

S Cube Mass Transfer Pvt Ltd,
Pune, India

Mr Chetan B Sayankar is the Managing Director and CEO of S-Cube Mass Transfer Pvt. Ltd., Pune. He is a spade of ace in the Biofuel sector, Oil and Gas, Speciality chemicals and other Process Industry. With almost 17 + years of extensive contribution as a consultant, Mr Chetan has engineered and commissioned over 19 + medium and large scale manufacturing plants for biodiesel, first and second generation ethanol, metering skids, and gas recovery. Mr Chetan holds a diploma and bachelor's degree in Chemical Technology. He has widespread experience in Process engineering research, Business development and Management. He holds a patent for "Selective enzyme based process for Biodiesel manufacturing" and has published several research articles in international journals and conferences. Having a passion for a cleaner planet for the people who wish to contribute to it, Chetan has a wide-spread network with professionals across the globe, he has established S- Cube Mass Transfer Pvt Ltd. Previous to that he started USA origin companies in India and ran their operation for more than 5 years as an Operation Head . Now S- Cube Mass Transfer Pvt Ltd provide complete solution to Mass Transfer Technology to Process Industry



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Mr. Sashikant Madgula

Business Segment Leader, Clean Fuels & Chemical Licensing Group,
Sulzer Chemtech, Houston, U S A

Renewable diesel, also referred to as hydrotreated vegetable oil (HVO) and Sustainable Aviation Fuel (SAF), is a hydrocarbon fuel derived from biomass-based fats, oils, and greases (FOGs). These feedstock materials are primarily triglycerides, or three fatty acids chains on a glycerol backbone, and can be sourced from plant oils and animal fats as either virgin or recycled materials. Each source is unique in terms of the fatty acid profile and the pre-treatment steps necessary for use as a feedstock for the renewable diesel production process. These triglycerides also contain trace components such as phosphorus, chlorides, and metals, which are present in the fat or oil due to its growing conditions or any processing it has undergone, including when used as cooking oil.

Current process technologies comprise multiple steps usually including several pre-treatment steps, before being processed undergoing hydrodeoxygenation and hydro isomerization to produce renewable diesel. Challenges include high hydrogen consumption, catalyst coking, large reactor exotherms and difficulties in the removal of contaminants.

This presentation will review recent advances in the process technologies used for producing renewable diesel, more specifically an advanced liquid phase hydrotreating process that can enable lower carbon intensity for renewable diesel production by reducing the capital and operating costs, thereby lowering the greenhouse gas emissions further compared to conventional processes. This advanced process technology called BioFlux, together with an integrated hydrogen production offer significant reduction in costs (both operating and capital) as well as reduced carbon intensity versus current industry norms.

This presentation is centered around the following themes: i. Industry transformation to sustainable clean fuels; ii. Challenges of processing fats, oils and greases and iii. BioFlux hydro processing unique reactor system for the hydro processing steps and integration of hydrogen production

ABOUT THE SPEAKER



Mr. Sashikant Madgula
Sulzer Chemtech, Houston,
U S A

Mr Sashikant Madgula is a Business Segment Leader in Sulzer Chemtech's Clean Fuels & Chemical Licensing group (Previously called GTC Technology), Houston, USA. He is responsible at Sulzer Chemtech for the market development of technologies for renewable fuels and chemical recycling of waste plastics. Mr Sashikant holds a Master's Degree in Chemical Engineering Practice from the Massachusetts Institute of Technology. He has diversified experience in the refinery and petrochemical industry specializing in aromatics and olefins value chains, previously in leadership roles in Southeast Asia and the Pacific region. Before that, he also managed the technical services of start-up/commissioning of aromatics extraction plants licensed by Sulzer Chemtech at various client sites. Prior to joining Sulzer, Mr Sashikant worked for ICIS and Argus in their consulting teams, where he was responsible for executing bespoke studies on refinery and petrochemical markets in Asia for various clients.





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Mr. Premanand Vettukattil

Vice President (Automation), Desmet Ballestra India Pvt Ltd., Bengaluru, India

The present industrial revolution, 4.0 gives opportunities as well as challenges to Industrial automation, specifically to edible oil industry. Edible oil industry automation is still to reach the levels of automation that is generally seen in petrochemical/automobile or other manufacturing industries. IoT comes with many opportunities. To improve efficiency, productivity etc. It provides analytical data, KPIs and goes beyond plant operations. Along with the opportunity comes challenges of interfaces with various hardware and software present in the plant shop floor. The two facets of digitalization/IoT will be to renew/upgrade the existing automation system and add IT applications on top of it. The OT-IT overlap which was there for quite some time now becomes even more relevant. Data security is another important aspect which needs to be taken care in this world of IoT, connectivity and open systems. As the prominent automation system manufacturers are flooding the market with IoT apps for process industry, it become important for OEMs, technology suppliers to play a role in bringing the best out of the IoT apps as the vendors lack process knowledge. The triangle of technology provider, IT applications vendor and IoT thus becomes a formula for successful implementation of I 4.0 / Digitalization in edible oil plants. The presentation covers the above aspects, suggests the way forward for technology suppliers. It also covers Digitalization apps developed in house by Desmet Automation for refining, fat modification and solvent extraction process plants.



ABOUT THE SPEAKER



Mr. Premanand Vettukattil

Desmet Ballestra India Pvt Ltd.,
Bengaluru, India

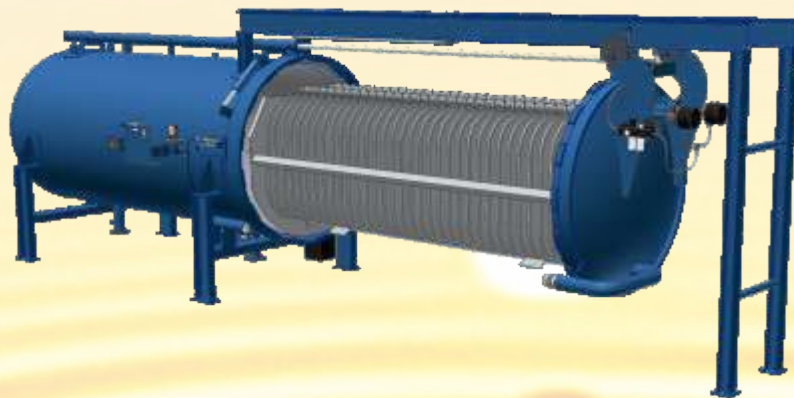
Mr Premanand Vettukattil is the Vice President - Automation at Desmet Ballestra Engineering Center Pvt. Ltd, Bengaluru. He is a Control Engineering professional with Electronics and Telecommunication engineering background. He has an experience of over 30 years in various industries including edible oil refining. He has held several key responsibilities as Global Head for automation and E&I engineering in DESMET group. Mr Premanad has been responsible for automation of edible oil processing plants, standardization, and digitalization developments in Desmet. He is responsible for the introduction of standards for PLC programming resulting in uniform standards throughout Desmet. He has also introduced ISA 101.1 standards for HMI development bringing Desmet to international norms of HMI development as the HMI standard is named as DBSWIFT (Desmet Ballestra Standard Windows Interface and Template). Mr Premanand has introduced and launched Automation Functional Descriptions for every program that comes out of the Desmet Global Team. He also developed simulation software for easy simulation of program during FAT/SAT and provided Remote support & services for clients across the globe using secure VPN routers. At present, Industry 4.0 related developments and preparations are in progress in Desmet. Mr Premanand took over global E&I responsibility from 2021. He has started the Global Support Teams for Field services (Pre-commissioning, Commissioning & Start up) and Liquid Process Design. He has presented several papers at national and international conference.



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- (6) For continuous operation of MEEs to enable ETPs operate at full capacity at all times and reduce the CIP cycles.

Salient Features of Smart Rod Systems:

- (1) Easy to install and incorporate in existing set-ups being very compact in size.
- (2) No moving parts and therefore, practically nil maintenance.
- (3) Has very low operating cost as it consumes only around 0.005 Kw electricity.
- (4) Can be incorporated in Stagnant as well as Flowing water systems as well.
- (5) Can be scaled up for infinity Capacity
- (6) Mildly increases the pH level of water, reducing the corrosion rates of Pipes, Tubes and Fittings.
- (7) Reduces load to the ETP systems due to lower water wastages & thus its operating cost.
- (8) Enables extremely **fast payback periods** due to reduction in usage of Scale, Biofilm and Algae prevention Chemicals, Chemical storage space, reduced labour inputs & less water wastages.

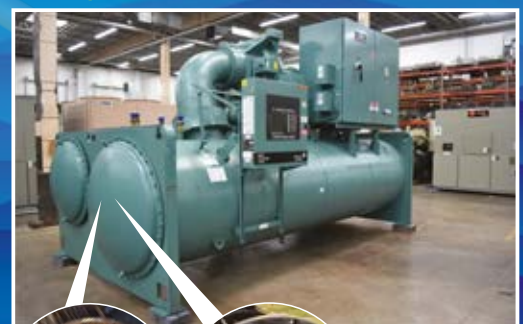
Typical installation of Smart Rod in Cooling Tower basin



Smart Rod System removes scale & biofouling from the Surface of RO membranes



Smart Rod enhances Chiller performance by ensuring clean tubes all times



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Role of Instrumentation in Predictive Diagnosis of Critical Process Parameters in Fats & Oils Refinery

AI21

Mr. Sanjeev Saraswat

Senior Executive (Process Management & Execution) Yokogawa India Limited,
Bengaluru, India

The vegetable oil process and fats refining industry is undertaking great effort to ensure high levels of process reliability, consistent product quality and accurately priced billing of goods. There is also an increasing need to prove that operation is sustainable and ensure asset availability (like centrifuges, additive dosing systems, utility etc.) for long duration. State-of-the-art process measuring technology is the key to ensuring highly stable measurement results over a long period of time. Despite this, it is today common practice to inspect quality or safety-related measuring points at regular intervals.

Field instruments have enhanced smartness to communicate not only instrument status but also process status. The self-diagnosis makes it possible to reduce efforts for the asset management of these devices significantly by preventing unnecessary maintenance work or calibration cycles. Furthermore, this supports quick troubleshooting or – through constant analysis in a condition monitoring system through early identification of trends – even help prevent unscheduled plant shutdowns and minimize unscheduled downtime. Many important process parameters data analytics viz flow, pressure, temperature, level, vibration, pH, conductivity etc. can be collected and evaluated using AI to improve the process reliability. Moreover, verification reports can be created based on device internal tests, which allow the device to document its health condition itself in a way, giving more confidence to the process user. For example, mass flow meter play crucial role in the process for mass balance, FFA balance etc., where measurement accuracy level is important. Field verification provides confidence to the user that the instrument is delivering accuracy, not at lab/reference condition but at field condition, consistently.

The presentation will provide insight on predictive diagnosis along with critical process information, thereby improving process reliability and consistency

ABOUT THE SPEAKER



Mr. Sanjeev Saraswat
Yokogawa India Limited,
Bengaluru

Mr. Sanjeev Saraswat is associated with Yokogawa India Limited for over 22 years and now assisting users with technical matters and training, as well as promoting new technologies to prospective members and users. He was involved in development to launch of Yokogawa flowmeter with TOTAL INSIGHT concept, leading team from Europe, Singapore, Japan, US etc. The concept is extended to other smart field instruments, which helped user from selection to extending performance in product lifecycle. He is graduated in Electronics & Communication from NIT, Warangal with experience of over 32 years in process control and automation business, covering all the 3 industry-segments – engineering consultants, equipment manufacturers and end-users. Diversity of assignments gave Mr Sanjeev international exposure and experience in multiple fields. Prior to Yokogawa, Mr Sanjeev worked extensively in the field of sales and marketing across India in providing solutions to process challenges across various industries

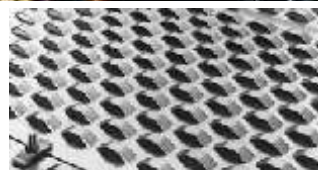
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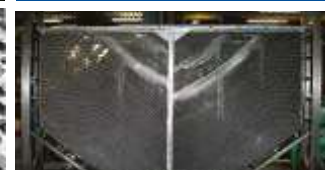
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Process Automation Advancements & Challenges for Fats and Oils Industry

AI22

Mr. Shriram Pendse

Head, Max Controls, Pune, India

Fats and oil process industry is facing several issues and some of the prominent are as follows: Seasonal nature of inputs of varying quality, Dependency on skill and expertise of process personal, Wide range of products, requires flexibility, Changing market tastes, Environmental and regulatory issues, Keeping pace with technology advancements and Higher level of reliability and Fail-safe control system etc. At present the state of automation at several traditional industries is either totally manual operations or semi auto or standalone controllers/MIMIC with basic PLC HMI systems. However, in some cases advanced Intelligent PLC HMI Scada Based Systems, DCS / PKS Based systems employing APS and industry 4.0 based intelligent process control systems are existing. Automation systems can result in following advantages like providing reliable and cost effective technology, providing fastest ROI by optimal use of resources, ease of operation, access from various level, maintenance friendly systems (CMMS, CBM), transparency at all levels, integration of MES/ERP, plant floor and operation systems, providing data acquisition, reporting and analytics, security of data, plant and information (Cyber Security), regulatory compliance and environmental issues, Energy saving, safety monitoring and quick response, Integration of lab analysis reporting and automation and condition monitoring systems. The presentation describes about some emerging automation technologies like fast and reliable embedded systems, advanced PLC systems, PAC based intelligent systems, hybrid DCS / plant knowledge systems, industry 4.0 based intelligent control systems using AI and ML, smart instrumentation & fieldbus technology, cloud and IIOT based systems, field, control, MES/ERP and management level integrated systems etc. useful for oils and fats industry.

ABOUT THE SPEAKER



Mr. Shriram Pendse
Head, Max Controls,
Pune, India

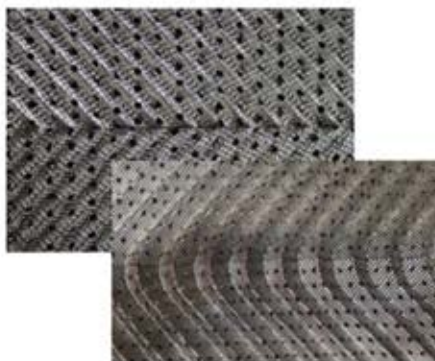
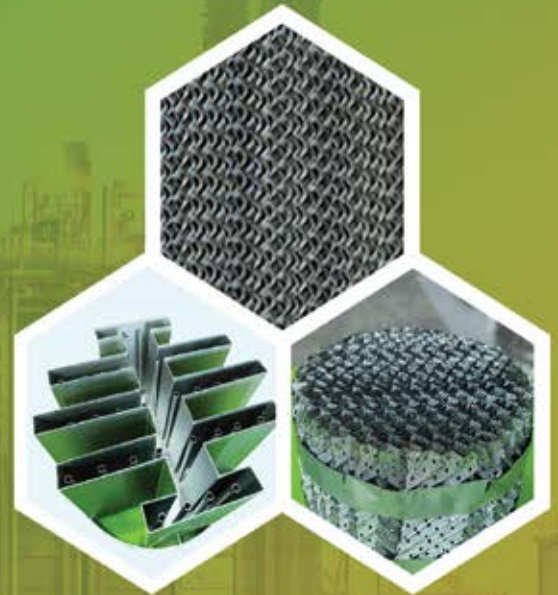
Mr Shriram Pendse is Tech Head at Max Controls, Pune, India and also a well known Industrial Automation Professional & Corporate Trainer on Industrial Automation Systems. He completed BE (E&TC) and also has Diploma in Computer Applications. Mr Pendse has expertise in the areas of Planning & conducting In-Plant Training in Manufacturing & Process Industries; Embedded System development for Defense systems; Avionic Control Systems , Electronic Warfare systems and Project Engineering on following systems: PLC , Scada , DCS based control systems for Edible Oil Plants, Food Processing Plants, Sugar and Chemicals, Oil And Gas Plants, Automobile, Auto components manufacturing, FMCG Manufacturing plants. He also handled several Systems like Siemens, Honeywell, Rockwell, Mitsubishi, Schneider and Microsoft Technologies





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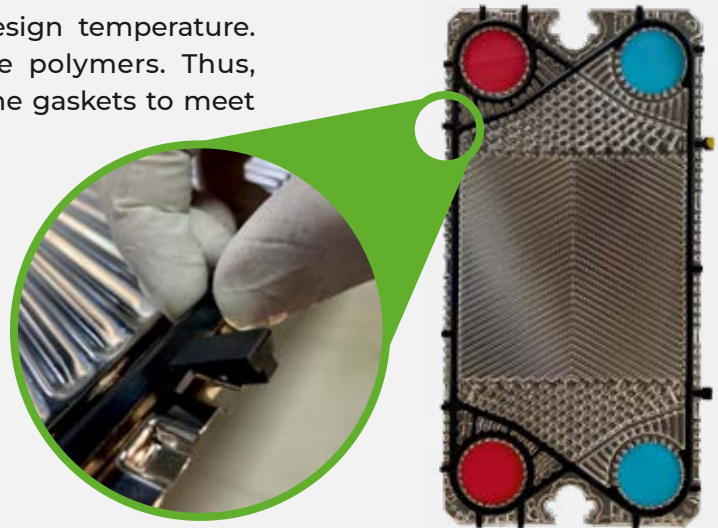
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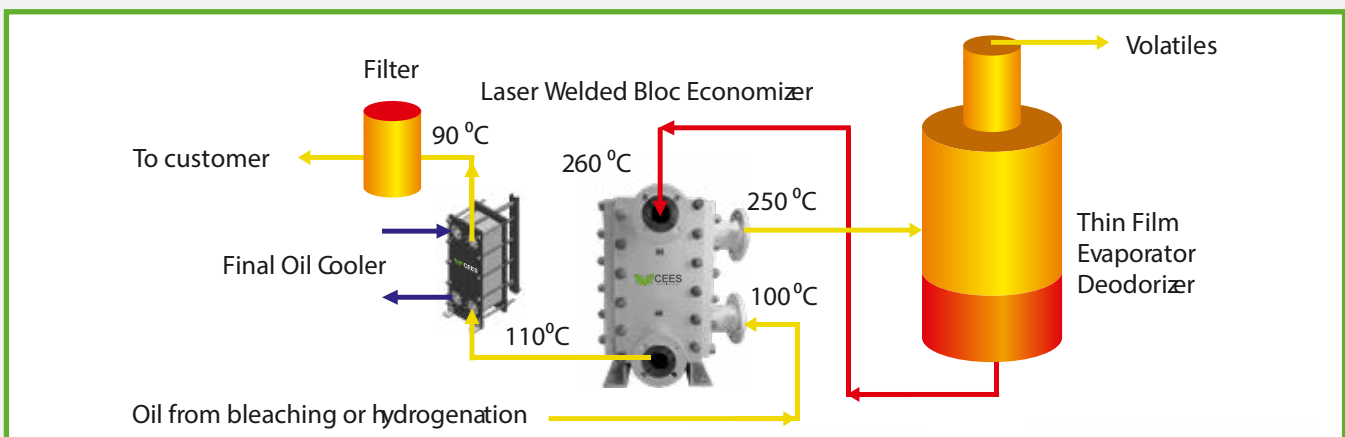
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Role of Automation in Improving Efficiency of Production in the Edible Oil Industry

AI23

Mr. Ritesh Raka

Manager (Business Development - Food & Beverages), Siemens, Mumbai

Due to low margins, edible oil industry is looking for new solutions to increase the efficiency of its production. Automation and digitalization offers new ways of optimizing the entire value chain. Automation and digitalization help to maintain increased plant availability, enhanced throughput, energy optimization, operator efficiency and maintenance efficiency enhancement.

The presentation will cover the complete electrical automation and digitalization solution starting from supply chain, product designing, edible production processes, energy efficiency and plant maintenance.

ABOUT THE SPEAKER



Mr. Ritesh Raka

Manager (Business Development -
Food & Beverages),
Siemens Limited, Mumbai, India

Mr. Ritesh Raka graduated in Instrumentation & Control from the University of Pune and has around 17 years of experience in the automation industry. He has worked in different areas of the automation industry such as application development, technology marketing, digital marketing. Mr Ritesh has expertise in Packaging, Automotive and Food and Beverage Verticals.

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