

2020 AOCS Annual Meeting & Expo Processing Abstracts

2020 AOCS Annual Meeting & Expo Processing Abstracts

June 29 to July 3, 2020

Hosted online by the American Oil Chemists' Society (AOCS)

For more information, please visit <https://annualmeeting.aocs.org>.

Presentations dated Friday, January 1, 2021, were provided on-demand.

Processing

Monday, June 29, 2020

Session Time: 8:25 AM - 11:20 AM

Presentation Time: 8:30 AM - 8:55 AM

Track: Processing

(3611) Pilot Plant Concept „EthaNa“ for Ethanolic Mild Extraction of Dehulled Canola Seed

Presenting Author: Agnes Pior - B+B Engineering

With regard to the development of efficient and environmental friendly oilseed processes EthaNa represents an innovative technology which combines a specific dehulling process with a mild ethanolic extraction. The concept, developed by a consortium of research institutes, engineering companies and oilseed processing industry, includes the process development and the transfer of results from laboratory to pilot scale. In order to prepare this technology for industrial use a pilot plant is constructed at Fraunhofer CBP in Leuna/Germany. Pre-liminary tests of the key-equipment showed successfully the benefits of the EthaNa process. These results will be presented. The first step is a dehulling process using fluidized bed technology with the goal of less than 3% hull content in the canola seed kernels. In a second step, the innovative approach of using peeled canola seed enables the use of a new treatment of breaking the cells combined with an extraction with ethanol. After the removal of the solvent and the separation of the oil and various phases, a high-quality canola-seed-kernel-concentrate is obtained. The mild processing conditions allow the nearly complete elimination of anti-nutritive substances like glucosinulates from the canola-seed-kernel-concentrate without damaging the proteins. At the same time, bioactive compounds can be fed to an additional separation process. The extracted oil has an improved quality and can be considered as a pre-refined oil with significantly less expenditure on the refining process. The protein-rich canola-seed-kernel-concentrate allows a considerable increase of use and value, for example as improved animal feed as well as the development of new applications for canola seed proteins for technical use and for food.

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Monday, June 29, 2020

Session Time: 8:25 AM - 11:20 AM

Presentation Time: 9:20 AM - 9:45 AM

Track: Processing

(3714) Technical Trends in Extraction and Refining

Presenting Author: Matthew Williamson, Professional Engineer - ADF Engineering

Technical Trends in Extraction & Refining M. T. Williamson, P.E., ADF Engineering Inc., Miamisburg, OH, USA. Recent changes to consumer demands and industry regulations have had sweeping impacts on oilseeds manufacturing processes and operations. Consumer concerns over hexane use in extraction, allergen cross-contamination, trans-fats, and organic and non-GMO feedstocks have resulted in a resurgence of Mechanical Extraction technology and a need for segregated feedstock and oil handling equipment and piping. New regulatory requirements for Food Safety, Waste Water Pre-Treatment and Combustible Dusts have also driven major capital upgrades across the industry. How do you prioritize and integrate all of this change? How can these new production demands be dealt with inexpensively? Are any of these trends conflicting? This presentation will discuss the impacts of these new trends on oilseeds manufacturing and strategies for successful implementation.

Monday, June 29, 2020

Session Time: 8:25 AM - 11:20 AM

Presentation Time: 10:30 AM - 10:55 AM

Track: Processing

(3990) Cracking and Flaking of Oilseed

Presenting Author: Robin Schneider - Buhler

What can be done to improve cracking and flaking performance for oil seeds processing. Reviewing cleaning possibilities of oil seeds with emphasizing the impact of stone removal. Online monitoring of process parameters and responding correction of machine settings.

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Monday, June 29, 2020

Session Time: 8:25 AM - 11:20 AM

Presentation Time: 10:55 AM - 11:20 AM

Track: Processing

(3755) Refining Process Improvements Using Hydrodynamic Cavitation Technology

Presenting Author: Darren J. Litle, MBA - Arisdyne Systems Inc

An overview of the application of controlled flow cavitation (CFC™) phenomenon for the intensification of chemical processing applications is presented. For vegetable oil degumming and/or neutralization reactions, the reasons for enhanced performance of the refining operation, reduced environmental impact, observed reduction in necessary acid and/or caustic addition as well as decrease in oil loss, potential savings in steam consumption and decrease in maintenance opex is discussed and industrial scale examples given. The efficient removal of residual soaps, phosphorus, ffa and metals while minimizing and in some cases even eliminating the need for water washing or silica addition is also described along with the practical considerations to utilizing the technology and expected changes to process.

Thursday, July 2, 2020

Session Time: 8:25 AM - 11:45 AM

Presentation Time: 8:25 AM - 8:30 AM

Track: Processing

Introduction: General Processing

Co-Chair: Rich Clough, Texas A&M University, USA

Co-Chair: Mohammad S. Alam, Texas A&M University, USA - Texas A&M-Chemical Engineering

In this session, key speakers from industry and academia will present on new technological breakthroughs (equipment and software), with topics covering the entire oil processing-chain. Presentation and discussions will focus on reducing operating expense, increasing profit margin, improving oil quality and valorizing co-products.

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Thursday, July 2, 2020

Session Time: 8:25 AM - 11:45 AM

Presentation Time: 8:30 AM - 8:55 AM

Track: Processing

(3842) Refinery Performance Tests and the Missing Plutonium

Presenting Author: Alan R. Paine, BSc - Desmet Ballestra

In 2005 the UK Atomic Energy Authority revealed that its audit for the previous year had failed to account for 30 kg of plutonium, enough to make a number of powerful nuclear bombs. Fortunately, they had not had thirty 1 kg lumps of plutonium stolen by terrorists. The error lay in a 0.1% discrepancy between the amount of plutonium received in spent fuel rods and in the reprocessed material they had delivered. In the edible oil processing industry it would be very difficult to balance the inputs and outputs of a refinery to the stringent standards required for nuclear reprocessing even though 0.1% of a refinery's output could be worth a large amount of money. The presentation will look at the difficulties of monitoring oil flow and losses in a refinery and how it might be possible to do better. Whenever you take a measurement you have to consider how the measurement was done and the likely error. We shall look at some surprising examples that show how easy it is to misinterpret what you think you are measuring. The presentation will be a repeat of the one prepared for the February meeting in Australia.

Thursday, July 2, 2020

Session Time: 8:25 AM - 11:45 AM

Presentation Time: 10:30 AM - 10:55 AM

Track: Processing

(4005) Multi-stage Deacidification & Deodorization for online fractionation of Free Fatty acids from high FFA oil feedstock like Palm, Coconut and Palm Kernel oil

Presenting Author: Dnyanoba Chame - DVC Process Technologists

In general physical refining process of high FFA vegetable oil feedstock like Crude Palm oil, Palm kernel oil, Coconut oil, and Rice bran oil, comprise of single deacidification & stripping followed by deodorization to produce an acceptable quality of Refined oil for human consumption directly or indirectly. The new method of the Fractionation Deacidification Distillation process carried out at a high degree of vacuum will separate deodorizer distillates online during deacidification and scrubbing. The number of stages of deacidification and scrubbing depends on the number of fractions to be produced and their purity requirements. This new technique can add value to the deodorizer distillates (byproducts) at no extra cost of processing.

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Thursday, July 2, 2020

Session Time: 8:25 AM - 11:45 AM

Presentation Time: 11:20 AM - 11:20 AM

Track: Processing

(3807) Controls Migration allows for Integration and Information (data) for Plant Production Floor

Presenting Author: Bob Frey, CPM - Automation Plus

There are countless buzz words surrounding Industry 4.0 in today's world but what does it actually mean? And how do we implement this within operations? Automation Plus brings quantifiable operational improvements through technology, implementing industry 4.0. In putting meaning to it, Automation Plus says industry 4.0 means this: • Real Time Connection to Business Systems • Holistically Optimizing Operations • Predictive Production/Maintenance • Targeted Equipment/Operation Analysis • Automating/Verifying Manual Processes • Agile Manufacturing Automation Plus implemented industry 4.0 for a major manufacturing facility, within a highly regulated industry, by completing a control system modernization from AB PLC-5 to a modern server based distributed control system (PlantPax) in a fully validated environment. The customer's challenges included reliability issues, production inefficiency, and material tracking issues. An interface between factory floor control and the SAP enterprise system was implemented. The solution enabled increased production, total paperless production, ERP level logistics and integration and full simulation system for training and offline modifications. Our customer had a list of reasons why they selected this solution. The reasons included migrating to modern and scalable automation technology, the technology supported FDA validation processes, it both mitigated risk and minimized operational costs, and it provided electronic records and data security. Automation Plus provided not only technical expertise but also industry expertise and insight for a total project success.

Thursday, July 2, 2020

Session Time: 11:45 AM - 12:40 PM

Presentation Time: 11:45 AM - 11:50 AM

Track: Processing

Introduction: Contaminants

Co-Chair: Veronique J. Barthet, PhD - Canadian Grain Commission

Co-Chair: Uwe Nienaber, DSM Nutritional Products, USA

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This session focuses on contaminants relevant to current process practices, mitigation strategies and regulatory aspects. Contaminants comprise environmental pollutants such as heavy metals, pesticides, PCBs, dioxins or PAHs, and process contaminants such as 3-MCPD- and glycidol esters, mineral oil hydrocarbons, and phthalates. Examples of current and new practices applied to seed conditioning, seed preparation, extraction, degumming, physical refining, alkali refining, bleaching, short-path evaporation, deodorization, interesterification, fractionation and fractional distillation will be presented in this session.

Thursday, July 2, 2020

Session Time: 11:45 AM - 12:40 PM

Presentation Time: 12:40 PM - 12:40 PM

Track: Processing

(4214) Mitigation of Contaminants: Important but not the only Objective of Edible Oil Refining

Presenting Author: Wim De Greyt - Desmet Ballestra Group

Refined oil quality is evaluated primarily by traditional quality parameters such as a low residual free fatty acid content, a high oxidative stability, a light color and a bland odor and taste. In addition, high quality food oils need to contain low trans fatty acid levels, high amounts of natural antioxidants (tocopherols) and very low or no (process) contaminants such polycyclic aromatic hydrocarbons (PAH), pesticides, dioxins, polychlorinated biphenyls (PCB), 3-monochloropropanediol (3-MCPD)- and glycidyl esters (GE). Increased attention from consumers together with new (EU) regulation that imposes stricter limits for several contaminants are forcing edible oil refiners to continuously optimize their refining processes. In the bleaching process, activated carbon is now systematically used for the removal of light PAH. A reduction of the heat load during deodorization is obtained by applying dual temperature deodorization, all or not in combination with a packed column stripper while more powerful vacuum systems (chilled barometric vacuum system or dry ice condensing) are implemented for a better stripping . Lowering the heat load during deodorization surely has a positive impact on the reduced formation of process contaminants (TFA, GE), while a deeper vacuum gives improves stripping of volatile contaminants (pesticides, PCB, light PAH), but all these process improvements has to be adopted in a smart way to ensure that the refined oil still has a light color (enough heat bleaching), a good oxidative stability (not too much stripping of natural anti-oxidants) and a good shelf life (good deodorization). In conclusion, optimizing the refining process conditions is such a way that all traditional and nutritional quality parameters can be met at the same time is a real challenge and requires a very good understanding of the impact of the various process parameters on the individual quality parameters.

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Friday, July 3, 2020

Session Time: 1:00 PM - 3:00 PM

Presentation Time: 1:00 PM - 3:00 PM

Track: Processing

CBD /Hemp Processing: Challenges and Opportunities for Innovation

Co-Chair: Rob Reintjes - Artisan Industries Inc.

Co-Chair: Emmett McGregor - SciPhy Systems

Co-Chair: John Mark Herring - SciPhy Systems

Who should attend? This talk will be of interest to All AOCS members, including those from research organizations (academic & corporate) chemist / chemical engineers, process consultants, and equipment developers. Our goal is to encourage AOCS members to consider working in the hemp space, and to connect with the speakers and explore possible collaborations in the future. **The hot topic symposium focuses on the technical challenges and opportunities in processing CBD / Hemp.** Starting with a broad survey of the Hemp processing industry, the presentation will then cover the primary methodologies of extracting and purifying a complex mix of Cannabinoids and a multitude of other bio-active compounds from Hemp and discuss some of the inherent challenges associated with each process. The presenters will then dive deeper into the challenges of Cannabinoid processing and the opportunity space in the emerging hemp derived ingredients market. Demand for CBD products is growing world wide by billions of dollars each year, yet rudimentary extraction, distillation, and crystallization processes predominate across this industry. Many state of the art techniques and technologies from food, pharmaceutical, flavor and fragrance industries have yet to be applied. The presentation will explore the general makeup of hemp extracts, the classes of common impurities, and common requests from hemp processing plant operators for process improvements that indicate as yet unaddressed opportunities for research organizations, process consultants, and equipment developers. The presentation will be a live webinar and attendees will have an opportunity to post questions for the speakers to address during the talks. Our goal is to encourage AOCS members to connect with the speakers and explore possible collaborations in the future.

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Friday, January 1, 2021

Session Time: 1:00 AM - 2:00 AM

Presentation Time: 1:00 AM - 2:00 AM

Track: Processing

(4061) Oil Recovery from Spent Adsorbent in Renewable Diesel Pretreatment

Presenting Author: Alex Slichter - Crown Iron Works

Renewable diesel is a fast and growing market. Contaminants such as phosphorus and metals must be removed to very low limits to not negatively impact the hydrotreater catalyst. This requires a large amount of bleaching clay. At the scale of new renewable diesel plants, this can equate to many tons per day of clay and entrained oil. This can not be added to feed streams due to the mix of low quality feedstocks. The spent clay is also prone to auto-ignition. Crown has developed a 'bolt on' technology to recover the oil from the spent clay and remove the risk of combustion as well as boost the yield of the pretreatment plant.

Friday, January 1, 2021

Session Time: 1:00 AM - 2:00 AM

Presentation Time: 1:00 AM - 2:00 AM

Track: Processing

(3883) Progress in Understanding the Occurrence and Mitigation of 3-MCPD and Glycidyl Ester in Edible Oils over the Last 14 Years

Presenting Author: Bertrand Matthäus - Max-Rubner-Institut

About fourteen years ago the first publication on the occurrence of 3-MCPD fatty acid esters in edible oils has been published by a Czech group. One year later it was shown that especially the high temperature during deodorization was responsible for the formation of the esters. Due to the classification of 3-MCPD as possibly carcinogenic by IARC and glycidyl esters, later also found in edible oils, as probably carcinogenic, and the assumption of the German Federal Institute for Risk Assessment (BfR) to assess bound 3-MCPD and glycidol comparable to the free compounds the industry was requested to develop mitigation strategies for minimizing the formation of the esters during processing. The implementation of a legal limit for glycidyl ester in 2017 further forced the industry to introduce mitigation steps to produce edible oils low in ester contents. A legal limit for 3-MCPD esters is still under discussion. The current lecture summarizes the different efforts made in the last twelve years to reduce the content of esters during the production of edible oils. The mitigation strategies comprise (1) the raw material with approaches to reduce the formation of precursors before oil processing, (2) the refining process with adjustment of conventional steps like degumming, bleaching or deodorization or the

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introduction of new processing steps such as two-step deodorization or the application of a treatment with ionic liquids and (3) the preprocessing of already refined oil. Meanwhile different guidelines for the mitigation of the esters have been published or are under preparation.

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Session Time: 1:00 AM - 2:00 AM

Presentation Time: 1:00 AM - 2:00 AM

Track: Processing

(3604) Improvements in the Use of Silica Technology in the Edible Oil Refining Processes

Presenting Author: John P. McNichol, B.S.Ch.E; MBA, MIM - PQ Corporation

OBJECTIVE/HYPOTHESIS Silica gel has been well established as a processing adjunct in edible oil refining. As refiners have become further challenged by tight margins, silica technology can help reduce overall processing costs. Recent improvements in product and processing methodology have helped refiners achieve greater margins via reduced operating expense. **METHODS USED** Data have been developed in the laboratory, in plant trials, and empirically demonstrating the advantages of incorporating silica technology. Silica gel has been successfully utilized in many unit operations with the two primary ones being water wash replacement and modified bleaching. Economic models of contrasting technologies are then created to verify the benefits. **RESULTS** The use of silica has effectively replaced water wash in many cases not only providing an economic incentive but environmental benefits as well. Similarly, inclusion of silica gel with the bleaching step has demonstrated overall lower processing costs and shown positive environmental impact vis-à-vis reduced filter cake generation. **CONCLUSIONS** The inclusion of silica technology has demonstrated economic benefits to edible oil processors in a myriad of ways including reduced chemical buy, lower utility costs, reduced environmental fees, lower utility costs and increased product yields.

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Session Time: 1:00 AM - 2:00 AM

Presentation Time: 1:00 AM - 2:00 AM

Track: Processing

(3981) Game Changer for Oil Stripping Technology

Presenting Author: Matthew Ducharme - Crown Iron Works

The FLEX CONTROL TRAY™ OIL STRIPPER is an industry breakthrough from the global leader in the oilseed processing industry. By rethinking conventional trays, Crown brings greater efficiency and reliability to oil strippers in extraction plants. Elimination of shutdowns caused by fouling with an innovative, patent-pending Crown solution. Designed to support the widest number of solvent plants, this new technology adapts to varying plant conditions ensuring you're always optimizing steam usage.

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Session Time: 1:00 AM - 2:00 AM

Presentation Time: 1:00 AM - 2:00 AM

Track: Processing

(3745) Flaxseed Secoisolariciresinol Diglucoside Extraction

Presenting Author: Yingxue Hu, MD - University of Saskatchewan

Flaxseed (*Linum usitatissimum* L.) is an important commercial oilseed crop for industrial, food and feed purposes. Its seed contains high oil content, dietary fiber and proteins, as well as, bioactive compounds (e.g. lignans). The principle lignan in flaxseed is secoisolariciresinol diglucoside (SDG), which is around 9 to 30 mg/g of defatted flaxseed meal. SDG has been found to have various health benefits, including anti-atherosclerosis, anti-cancer, and anti-inflammatory properties. These health benefits make SDG a high value product. SDG naturally exists in flaxseed in its free form, as a SDG polymer and as 3-hydroxyl-3-methylglutaric acid.

Traditionally, SDG production involved solvent extraction, membrane filtration and alkaline hydrolysis of flaxseed meal. However, the extraction yield of SDG is often very low due to the uncertainty and inconsistency in the variable natural forms of SDG. The presence of an alkaline solution also requires additional purification steps. In this study, modified method will be applied to include rotary evaporation to remove excess organic solvent and the alkaline hydrolysis step will be replaced by ammonia hydrolysis. This modification will avoid high maintenance costs for membrane filtration and will also simplify the removal of the alkaline reagent. Moreover, resin purification will also be involved. When compared to the traditional method, the modified method demonstrated higher SDG extraction yield and better purification efficiency, while

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lowering total operational cost. Presenter: yih018@mail.usask.ca; *Correspondence: martin.reaney@usask.ca

Friday, January 1, 2021

Session Time: 1:00 AM - 2:00 AM

Presentation Time: 1:00 AM - 2:00 AM

Track: Processing

(3971) Advances in the Solvent Extraction of Canola

Presenting Author: Adolfo T. Subieta - Desmet Ballestra North America Inc.

The operations of extraction, desolventizing, miscella distillation and solvent recovery are briefly described. For each step, examples of the latest advances are offered. Also examples of canola preparation enhancements directly connected with the extraction of canola are presented.

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Session Time: 1:00 AM - 2:00 AM

Presentation Time: 1:00 AM - 2:00 AM

Track: Processing

(4077) Precision Minimal Processing of Edible Oil

Presenting Author: Shengmin Zhou - Wilmar Global R&D Center

Objective: Chronic diseases of Chinese residents are growing rapidly, which are closely related to excessive fat intake and fat quality. At present, the overprocessing in edible oil industry is prominent, causing problems such as nutrition loss, food safety issues, and waste of energy resources. Therefore, precision minimal processing is a critical way to achieve nutrients retention and hazards removal. It is imperative to comprehensively promote precision minimal processing in edible oil industry. Methods : Precision minimal processing has been fully applied and industrialized in edible oil processing, innovatively integrated the screening of raw materials, enzymatic degumming coupled with physical deacidification, mild alkali refining, two-step bleaching, double towers with double temperatures deodorization and two-stage capturing technology, which enables the implementation of precision minimal processing. Results: Edible oils such as soybean oil, rapeseed oil, corn oil, sunflower oil, rice bran oil, flaxseed oil, roasted oils, and blended oil produced by precision minimal processing, all meet the requirements of zero trans fatty acid ($\leq 0.3\%$). Vitamin E & sterol retention rates can both reach more than 90%;

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3-MCPD \leq 1 mg/kg & GE \leq 1 mg/kg, ZEN \leq 1 mg/kg, B(a)P \leq 2 μ g/kg. There is no significant difference in flavor with the conventional processing edible oil. And also they have stable shelf life. Edible oil quality is significantly improved by precision minimal processing. Conclusions: The successful industrialization is conducive to the comprehensive promotion of precision minimal processing and promotes the technological progress of oil and fat industry in China.

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Session Time: 1:00 AM - 2:00 AM

Presentation Time: 1:00 AM - 2:00 AM

Track: Processing

(3648) Production of specialty fats through fractionation and enzymatic interesterification

Presenting Author: Veronique J. Gibon, PhD in Chemistry - Desmet Ballestra Group SA

Specialty fats are designed to resemble the functional properties of cocoa butter; there are three types: cacao butter equivalents (CBE), cocoa butter substitutes (CBS) and cocoa butter replacers (CBR). CBE can be customized by a proper selection of their constituents: hard palm mid fraction (HPMF) and shea butter stearin are the most used. Main sources of CBS are palm kernel and coconut stearin; commercially available CBS are usually post-hydrogenated. Fractionation is a fractional crystallization, followed by separation into solid and liquid; it is carried out by controlled cooling from the melt (dry fractionation) or after dilution (solvent fractionation). Premium quality HPMF is obtained by multi-step dry fractionation of palm oil; the first steps are conducted in dynamic mode; the last step is preferably performed in static. Solvent fractionation is another possible route enabling slightly higher grade for the HPMF. Dry fractionation of the shea butter is harsh, the reason being intimately linked to its triglyceride composition; the solvent technology is preferred. Modification of palm kernel oil into CBS is carried out through a combination of static dry fractionation and post-hydrogenation; single or double step enable to provide three types of CBS, some of which must not be post-hydrogenated. Coconut stearin is ideally produced by static dry fractionation; coconut-based CBS are softer even after post-hydrogenation. Another approach is the lipase-catalyzed production of CBE, leading to structured lipids with high amount of symmetrical SOS; this route remains quite costly considering the enzyme price and the necessary post-treatments: distillation and fractionation.

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Friday, January 1, 2021

Session Time: 1:00 AM - 2:00 AM

Presentation Time: 1:00 AM - 2:00 AM

Track: Processing

(3893) Proper Preparation Prevents...

Presenting Author: William C. Morpew - Crown Iron Works

Most activities benefit from good preparation. Within oilseed processing, while extractors, DT's, and distillation systems get all the color glossy brochures, the real work is done in preparation. If you haven't prepared the material properly, results will suffer. We look at which oilseed preparation factors are important and try to explain their relative importance in terms of plant results. Focus is placed on canola and soybeans, but the main concepts can be applied to other oilseeds. Time, temperature, and moisture all play a part, and we will track the effect of each parameter at different points through the soybean and canola processes. While equipment and design choices do influence plant results, a significant amount of variation is still dependent on operation. Understanding where the value is (and isn't) helps us all focus our efforts within a given process to achieve the best results possible.

Thursday, July 2, 2020

Session Time: 11:45 AM - 12:40 PM

Presentation Time: 11:50 AM - 12:15 PM

Track: Processing@@@Analytical

(4080) Mineral Oil Hydrocarbons: Edible oil industry in the field of tension between mitigation, high analytical deviations of mineral oil determination, potential toxicology and discussion on maximum residue levels

Presenting Author: Fernando Campos, PhD - ADM Research

The edible oil industry is more and more confronted on the one hand with high deviations of the analysis results of mineral oil contamination of oils and fats and on the other hand with the lack of clarity regarding the potential carcinogenicity of mineral oil components (e.g. 3-7 poly aromatic compounds) and the associated discussions on possible legal limits. In the field of analytics there has already been major progress towards lower detection and determination limits. However, there are no official methods that are applicable below 10 mg/kg. For some products, however, discussions are taking place on possible guide or limit values below 10 mg/kg. Results of accredited proficiency tests for oils and fats in recent years show that below 10 mg/kg accepted deviations can be up to 99% to pass the proficiency test. Below 5 mg/kg often not even an evaluation can take place, because on the one hand less results were available and on the other hand the deviations exceeded 99%. This fact and lack of clarity regarding the carcinogenicity of mineral oil components makes it difficult for the edible oil industry and

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authorities to agree on an action limit or maximum residue level. This presentation describes the progress in mineral oil analysis in recent years, the available toxicological data plus already existing orientation values of some European countries and discusses mitigation strategies.

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Session Time: 1:00 AM - 2:00 AM

Presentation Time: 1:00 AM - 2:00 AM

Track: Processing@@@Analytical

(3809) Mitigation of Glycidyl Esters in Mono- and Diglycerides

Presenting Author: Claus H. Christensen - PALSGAARD

Mitigation of glycidyl esters in fats and oils has attracted considerable attention over the last few years. Here, we show how glycidyl esters present in mono- and diglycerides can be mitigated by two fundamentally different strategies. The contaminating glycidyl esters can be present in the mono- or diglyceride either due to impurities in the parent oil or fat raw material or it can, surprisingly, be formed during the monoglyceride production process. We demonstrate how the content of glycidyl esters in the mono- and diglycerides is a function of the composition of the parent oil or fat, the process scheme, and the process conditions. The two different mitigation schemes are both capable of removing glycidyl esters to levels below 5 ppm in the final product. It is illustrated how the two methods can be employed at various steps in typical mono- and diglyceride production processes. Typical results from laboratory studies, pilot scale experimentation, and industrial-scale production are presented. The processes discussed are described in pending patent applications. The work includes detailed analytical and mechanistic studies required to reliably analyze various mono- and diglycerides mixtures, and to elucidate schematic reaction mechanisms and kinetics.

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Session Time: 1:00 AM - 2:00 AM

Presentation Time: 1:00 AM - 2:00 AM

Track: Processing@@@Analytical

(3890) Identification of the Key Bitter Off-taste Compounds in Rapeseed Protein Isolates

Presenting Author: Christoph Hald - Technical University Munich

Rapeseed, which is one of the most cultivated oil crops in the world, is mainly used for oil production and animal feed. Due to its high protein content and well balanced amino acid composition rapeseed has a high potential for its use in human nutrition. However, an unpleasant bitter off-taste perceived when rape seed protein isolates are consumed limits its application in foodstuff. By means of an activity guided fractionation, taste dilution analysis (TDA), followed by LC-MS/MS, LC-TOF-MS and 1D/2D-NMR as well as, LC-MS/MS quantitation experiments, kaempferol 3-O-(2''''-O-sinapoyl- β -sophoroside), was identified cause the bitter off-flavor.

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These results now can be taken to effectively navigate breeding rapeseed plans or technological processes and to improve application studies toward the production of preferentially pleasant and least bitter/astringent tasting protein isolates.

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Session Time: 8:25 AM - 1:00 PM

Presentation Time: 10:30 AM - 10:55 AM

Track: Processing@@@Biotechnology

(4190) Functional properties of novel Omega-3 Canola oil

Presenting Author: Diliara Iassonova - Cargill Inc

After decades of focused research, the novel canola crop containing long chain omega-3 (LCO3) (docosahexaenoic (DHA), eicosapentaenoic (EPA) and docosapentaenoic, (DPA)) fatty acids has been developed by Cargill-BASF to address an approaching fish oil supply limitation and demand for its sustainable alternative. Based on application: aquaculture, feed or food, there is a need for a variety of DHA/EPA/DPA containing canola oils products from expeller pressed to fully refined oils. Focus of this report was on novel canola seed and oil processing, pressed and refined oil quality including DHA/EPA/DPA % retention after deodorization. Oils from novel seeds have been produced following common canola industry processing steps at pilot and small production scale and then characterized for oxidative stability, fatty acid composition and natural antioxidants content. LCO3 canola oils contained >15% omega-3, >30% omega-9, and 8% saturated fatty acids. Novel oils had desirable 1:2.3 omega-3:omega-6 ratio and typical for canola oils >800 ppm tocopherols. Series of experiments have been conducted to optimize deodorization conditions to achieve target oil quality, tocopherols and over 94% LCO3 retention from pressed to fully refined oils. Pressed or crude oil quality DHA/EPA/DPA containing canola oils have been successfully used for aquaculture applications in salmon, trout and shrimp feeding trials. Fully refined LCO3 canola oils were tested in food applications to achieve nutritional targets and functional performance. The novel canola oil (Latitude®) opened unique opportunities for product developers as a sustainable source of LCO3 fatty acids and fish oil substitute for food and feed applications.

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Thursday, July 2, 2020

Session Time: 11:45 AM - 12:40 PM

Presentation Time: 12:15 PM - 12:40 PM

Track: Processing@@@Biotechnology

(3945) Reducing Glycidyl Esters in Edible Oil with Silica

Presenting Author: Chelsea L. Grimes - W R Grace & Co

Glycidyl esters (GE) in edible oil are known carcinogenic and mutagenic process contaminants that have recently been subjected to European legislation. In order to reduce glycidol concentrations in one pass RBD oil to proposed regulatory limits, we have studied a silica-based material at different temperatures, contact time, dosages, and initial GE concentrations without adversely affecting oil quality. Our presentation will outline properties of this novel material as well as catalytic performance in multiple oil matrices. We will also present a kinetic analysis of this reaction to incorporate this material into existing oil refining technologies and to ultimately remove the necessity for secondary refinement

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Presentation Time: 1:00 AM - 2:00 AM

Track: Processing@@@Edible Applications Technology

(3774) Novel Non-Expensive Physical Method to Produce Oils with Zero Free Fatty Acids

Presenting Author: Nissim Garti - LDS

Novel non-expensive physical method to produce oils with zero free fatty acids Nissim Garti and Pinchas Or 'beyond oil ltd' and Casali Institute of Applied Chemistry The Hebrew University of Jerusalem, Jerusalem, Israel Abstract In any 'cold-pressed edible oils' and mainly those recently consumed in high quantities because of their health benefits, contains considerable levels of Free Fatty Acids (FFA). Free fatty acids were found to contribute to the fast deterioration of the quality of the oil. Other studies are stressing the connection of the FFA to several health hazards and diseases including diabetes and cardiovascular events. It means that each one of us, throughout our lives, intakes into his, or her body, considerable amounts of FFA and other solid small particle and impurities. The alarming fact is that at any point, at any time, there are uncontrolled amounts of FFA hazardous in human's blood stream. After extensive research and development work 'Beyond Oil' found a novel physical filtration, that is applied on almost any oil, and it reduces the FFA (acidity) practically to zero. The revolutionary method does not require big investment and does not add much to the oil price, yet it makes the oil much healthier. The presentation will describe the patented technology and will discuss advantages of the procedure that does not involve any chemical reaction and does not affect the physical properties of any treated oil. To conclude- any cold press oil produced by Beyond oil method will be 'totally' free of FFA.

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Friday, January 1, 2021

Session Time: 1:00 AM - 2:00 AM

Presentation Time: 1:00 AM - 2:00 AM

Track: Processing@@@Edible Applications Technology

(3656) Green Methodologies for Lupine Oil Extraction

Presenting Author: Carlos Torres - University Autonoma of Madrid

Objective: Different clean methodologies for the extraction of lupine oil, in the absence of organic solvents, have been compared in terms of composition, yield, hydrolysis, and oxidation level. Methodology: Screw press oil extractor, enzyme assisted aqueous oil extraction, and supercritical fluid extractions have been utilized for the production of lupine oil Results: Combination of screw press and supercritical fluids is a powerful tool for obtaining lupine oil with excellent properties in terms of oxidation, low hydrolysis and good yield. Enzyme assisted aqueous oil extraction is a very promising technology that could be very valuable for developing drug or nutraceutical lipid delivery systems. Conclusions: The combination of clean technologies for the extraction of lupine oil could eliminate the utilization of organic solvents and the subsequent oil refining of edible oils. These strategies produce high quality oils with excellent nutritional values and lower oxidation levels compared to other more conventional extraction methodologies.

Friday, January 1, 2021

Session Time: 1:00 AM - 2:00 AM

Presentation Time: 1:00 AM - 2:00 AM

Track: Processing@@@Edible Applications Technology

(3595) Bleaching of Soybean Oil by Using Egg Shell Powder

Presenting Author: Maryam Gharachorloo - Islamic Azad University, Science and Research Branch

Bleaching is one of the important stages of edible oils production. The adsorbents that are used for bleaching, reduces pigments and other impurities namely soap, metals, phospholipids and oxidation products. Removing these impurities improves the sensory properties and oxidative strength of deodorized oil. The objective of the present research is to investigate the bleaching ability of egg shell powder in edible oils. Therefore the effects of five different types of adsorbents; egg shell powder, egg shell ash, commercial bleaching earth in different quantities and rates have been investigated on bleaching of neutralized soybean oil. Then peroxide value, free fatty acid, chlorophyll, carotenoids, metals (copper and iron) and oil retention have been determined. Egg shell structure was investigated and according to the results, the bulk of the egg shell consists of calcium and some other compounds such as magnesium, iron, and manganese. The results of the experiment showed that bleaching with adsorbents reduced the peroxide value and the acidity in bleaching stage. When egg shell was employed as adsorbent, carotenoid and chlorophyll contents were reduced considerably. The results indicated that acid activated egg

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shell powder might be employed as an adsorbent and regarded as a good alternative for bleaching of edible oils due to its high efficiency and low cost.

Monday, June 29, 2020

Session Time: 11:20 AM - 12:10 PM

Presentation Time: 11:20 AM - 11:45 AM

Track: Processing@@@Health and Nutrition

(3913) An Overview of Oil Contaminants

Presenting Author: Alan R. Paine, BSc - Desmet Ballestra

The aim of the presentation is to give a review of various types of contaminants in edible oil, how they come to be there and how they can be removed or avoided. We shall look at contaminants arising from outside the oil such as: poly-chlorinated bi-phenyls, poly-aromatic hydrocarbons, dioxins, pesticides and mineral oil. Contaminants arising from within the oil will also be considered: trans isomers, 3-monochloropropanediol esters (3-MCPD) and glycidyl esters (GE).

Friday, January 1, 2021

Session Time: 1:00 AM - 2:00 AM

Presentation Time: 1:00 AM - 2:00 AM

Track: Processing@@@Health and Nutrition

(3889) MOSH/MOAH - Mineral Oil Residues in Foods: a New Hot Topic in the EU

Presenting Author: Jan Kuhlmann, PhD - SGS Germany GmbH

MOSH/MOAH - Mineral oil residues in foods: A new hot topic in the EU Jan, Kuhlmann SGS Germany GmbH, Hamburg, Germany Jan.kuhlmann@sgs.com Traces of Mineral Oil Saturated Hydrocarbons (MOSH) and Mineral Oil Aromatic Hydrocarbons are food contaminants which are suspected to have adverse health effects. Mineral oils are used not only as fuels and lubricants but also in a countless number of petrochemical products worldwide. Consequently, various sources of food contamination have been identified so far. MOSH and MOAH have been found to occur in various types of foods. But, due to the lipophilic character of mineral oils, especially oils and fats and oil and fat containing foods seem to contain these undesired components frequently. In this respect, the European Commission (EC) as well as the European Food Safety Authority (EFSA) have addressed the need for monitoring the occurrence of MOSH and MOAH in foods and to define maximum levels especially for MOAH contents in foods due to the possibly genotoxic properties of certain MOAH fractions. This presentation should highlight the current status of MOSH/MOAH analysis, toxicology and action of the authorities.

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Monday, June 29, 2020

Session Time: 8:25 AM - 11:20 AM

Presentation Time: 9:45 AM - 10:10 AM

Track: Processing@@@Industrial Oil Products

(3967) The minimum Oil Residual is the right Choice

Presenting Author: Anibal Demarco - Desmet Ballestra

The minimum Residual Oil Content (ROC) in the meal come out of the extractor is considered like a clear benefit for a Crushing Plant. The more oil yield the better revenue for a Crusher. Anyhow still in some cases there is doubts regarding if low ROC is still beneficial due potential material (like FFA and Phospholipids) considering not desired in the extracted oil in the rest of the oil refinery process . In this presentation it is shown that there is not any economical limitation in to get the lowest ROC possible. But also is shown how to get a very low ROC. Although still many plants operate happy with 0,5 to 0,8% like normal residual oil content , some other crushers challenge those figures to get 0,3-0,4%. There are many parameters to be consider to have the best ROC out of the extractor. However there is a main aspect in the extraction process that has to be thoroughly consider since the very beginning. That is the “washing contact time”. Such parameter is critical to been able to optimize the overall Crushing Plant operation. Regardless of the extraction plant capacity the incremental investment in the extractor size to increase the washing time will pay back during a short period of operation.

Wednesday, July 1, 2020

Session Time: 8:25 AM - 11:45 AM

Presentation Time: 10:30 AM - 10:55 AM

Track: Processing@@@Industrial Oil Products

(3970) Gums : Alternative treatment to add value to that stream

Presenting Author: Anibal Demarco - Desmet Ballestra

The crude oil from the solvent extraction process contains water soluble components, primarily comprised of phospholipids, which need to be removed from the oil to enable minimum precipitation and settling during oil transport and long-term storage. The water degumming process involves adding water to the crude oil, hydrating the water-soluble components, and then removing the majority of the water-soluble components via centrifugal separation. The light phase after centrifugal separation is the crude degummed oil, and the heavy phase after centrifugal separation is a combination of water, water-soluble components and entrained oil, collectively referred to as “wet gums”. The composition of the wet gums produced by the water degumming process is approximately 50% moisture, 35% water soluble content, 15% entrained oil and trace meal fines. There is an oil loss of 0.5-1.0% of the crude soybean oil during the centrifugal separation due to some entrained oil passing with the wet gums. Enzymatic Gums Deoiling is a patented solution that can reclaim a portion of the entrained oil from the wet gums

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and simultaneously convert some of the phospholipids into diglycerides and fatty acids, also recoverable with the oil.

Wednesday, July 1, 2020

Session Time: 8:25 AM - 11:45 AM

Presentation Time: 10:55 AM - 11:20 AM

Track: Processing@@@Industrial Oil Products

(4095) Fuels and Coproducts from Brassica Carinata Oil

Presenting Author: Jocelyn M. Goodwin, PhD - Applied Research Associates

The Southeast Partnership for Advanced Renewables from Carinata (SPARC) is a USDA Coordinated Agriculture Project (CAP) with the University of Florida in partnership with Applied Research Associates, Inc., Nuseed, and other Universities. The twofold mission of this partnership is to remove barriers for commercialization of Brassica carinata for renewable fuels and coproducts and demonstrate enhanced value across the entire supply chain. ARA's role in this partnership is to demonstrate technology that converts carinata oil into jet and diesel fuels and to evaluate technology for production of valuable coproducts. Carinata oil is rich in the C22 fatty acid, erucic acid. The erucic acid can be recovered from the renewable fuels process and converted to fatty esters, fatty alcohols, or paraffin waxes. Erucic acid can also be converted to brassylic acid, a C13 diacid, which is a precursor to the synthesis of nylon 1313. The fuels conversion process also produces many renewable n-paraffin, cycloparaffin, and aromatic compounds, which can be recovered for multiple applications. The jet fuel produced by ARA technology was recently approved for commercial use by ASTM International as Annex 6 to ASTM D7566, the specification for Aviation Turbine Fuels Containing Synthesized Hydrocarbons.

Wednesday, July 1, 2020

Session Time: 8:25 AM - 11:45 AM

Presentation Time: 11:20 AM - 11:20 AM

Track: Processing@@@Industrial Oil Products

(4054) Processing Technologies For Pretreatment of HVO/HEFA Feedstocks

Presenting Author: Antonios Papastergiadis - Desmet Ballestra

Hydrotreated Vegetable Oils (HVO) also referred to as Hydroprocessed Esters and Fatty Acids (HEFA) are alternative renewable fuels to biodiesel. They are straight chain paraffinic hydrocarbons, free of oxygen and with a high cetane number. These fuels are produced via hydrotreatment of a wide variety of feedstock such as vegetable oils, animal fats and fatty acids. The apparent versatility of feedstock origin and quality is evidently an advantage but at the same time, it introduces some challenges in the pretreatment process prior to hydrotreatment. Pretreated feedstock needs to meet very strict specifications, not exceeding a few parts per

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million, for phosphorus, alkali metals, chlorine and other contaminants Reaching these strict specs is particularly difficult for cheaper, lower quality feedstock such as acid oils, certain animal fats and side streams such as distillates and distillation pitches. In this presentation, a number of effective pretreatment processes for various HVO/HEFA feedstock will be discussed.

Thursday, July 2, 2020

Session Time: 8:25 AM - 11:45 AM

Presentation Time: 8:55 AM - 9:20 AM

Track: Processing@@@Industrial Oil Products

(3879) An Integrated Zero Discharge Treatment Technology of Palm Oil Mill Effluent for a Circular Economy

Presenting Author: Soh Kheang LOH - Malaysian Palm Oil Board

Palm oil milling by-products including palm oil mill effluent (POME) are generated abundantly during operation and processing of fresh fruit bunches in mills which cause disposal issues if untreated. While anaerobic digestion and presently employed tertiary treatment technologies of POME are able to meet the current regulated biological oxygen demand (BOD) discharge limit of 100 mg/L, most of the POME treatment technologies in use are found inconsistent in their performance. We investigated the possibility of integrating several bio-processes mainly routed in 'pre-treatment-biological process–membrane separation' to treat POME which could transform the POME into several value-added products, i.e. bio-fertilizer (as compost for crops cultivation), biogas (as renewable energy source) and recycled water (as boiler grade water) with BOD <20 mg/L attainable at its final discharge. As the treated POME exhibits substantial NPK nutrients, with presence of volatile fatty acid from <0.58 g/L to the maximum 2-fold allowable concentration and oil & grease ranged 9.3 mg/L–18.4 mg/L, it can be conditionally used as a low-cost alternative to complement the widely used chemical fertilizers. The findings of this study offer a potential waste-to-wealth integrated approach using a locally available agricultural by-product (POME), maximizing resource recovery in producing biogas, recycled water and organic fertilizer, in meeting food-energy-water nexus resources demand and conserving the environment for a circular economy.

Thursday, July 2, 2020

Session Time: 8:25 AM - 11:45 AM

Presentation Time: 9:20 AM - 9:45 AM

Track: Processing@@@Industrial Oil Products

(3968) Last improvements in Seed Preparation Process

Presenting Author: Anibal Demarco - Desmet Ballestra

Description of the recent developments in Seed Preparation Plants. Today energy and pollution have a strong roll in the Crushing Oils seed Industry. The importance of having a good

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preparation process to make the Crushing industry sustainable minimizing pollution , maintenance, safety and utilities consumptions. Potential heat recovery are also possible in Seed Preparation Plant . Different process in hull dehulling makes great difference in performances when necessary to improve the efficiency of the plant. The presentation will give interesting view to make the right customized decision. The presentation also bring the attention to key points to be consider in the OPEX of Crushing industry.

Thursday, July 2, 2020

Session Time: 8:25 AM - 11:45 AM

Presentation Time: 9:45 AM - 10:10 AM

Track: Processing@@@Industrial Oil Products

(3969) Hexane Distillation News

Presenting Author: Anibal Demarco - Desmet Ballestra

The oil / solvent mixture that exits the extractor is known in the industry as miscella and has a solvent content of between 70 and 80% by weight. The objective of distillation is to thermally separate the miscella, into a fraction of liquid oil and a fraction of solvent vapor, and recover the solvent to be reused. This is what distillation is about and in this presentation we will make a brief description of the different processes that take place. We will also make a description of the most relevant equipment. At the same time, the most recent developments in this area will be specially noted.

Friday, January 1, 2021

Session Time: 1:00 AM - 2:00 AM

Presentation Time: 1:00 AM - 2:00 AM

Track: Processing@@@Industrial Oil Products

(3802) Monetization of Soapstock in Oil Refineries

Presenting Author: Rusty Sutterlin - Inventure Renewables

This presentation is an update on the development of Inventure's novel & disruptive technologies . The presentation will cover the following topics: • Technology improvements since last presentation (2018) • Plants construction & startup feedbacks **Soap carbonate technology**: Patented process for converting soapstock, gums, and fatty acid distillate residues from vegetable oil refineries into high value oleo-chemicals. Currently soapstock is a byproduct stream from chemical refining that is difficult to transport and store while having minimal if any value. Instead of losing money and struggling with your soapstock, Inventure offers a solution which allows for near complete recovery of targeted oleo chemical products, distills and recycles the water, produces no waste, consumes CO2 in lieu of sulfuric acid, and lifts the value of product converting your soapstock into a high value market profit center. Market applications of the product are seen through the Tall Oil Fatty Acid sector as well as an industrially-leading

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Carbon Intensity score (in process of acquiring this pathway through the Low Carbon Fuel Standard CA Market) of feedstocks Green Diesel/HVO. **Mixed Supercritical Fluid Biodiesel Technology**: Patented process that thrives on the lowest value waste oils and removes the need for a catalyst, enzyme, or any harsh acids/bases (nothing required outside of Methanol consumed stoichiometrically via the reaction) by using heat and pressure to create a super critical condition causing simultaneous esterification and transesterification reactions resulting in methyl esters and a premium, salt-free, crude glycerol exceeding typical purities

Friday, January 1, 2021

Session Time: 1:00 AM - 2:00 AM

Presentation Time: 1:00 AM - 2:00 AM

Track: Processing@@@Industrial Oil Products

(3560) Valorisation of Agricultural By-products, Especially Oil Rich Guayule Extracts

Presenting Author: Teerasak Punvichai - Prince of Songkla University

P. argentatum (guayule) is a dry climate bush producing polyisoprene (PI) having properties close to hevea's, and resin, a complex mixture of terpenics and lipids. The present work deals with (i) characterizing the biomass and (ii) extracting resin under low environmental impact conditions. This complements on the resin side previous works of the team on PI extraction with water (latex), under the framework of EU funded Eu-Pearls project and Prince of Songkla University. Chemical analysis (GC, TLC, HPLC, IR, NMR) which needed setting-up new extraction protocols, coupled to imaging techniques, shows the important variability among the 26 biomass samples of same genotype (age, place): resin content in biomass parts and composition. The ratio of unsaponifiable / saponifiable fractions is always found larger than 1; taking into account that this last fraction contains 65% of cinnamic and para-anisic acids issued from the saponification of guayulins (sesquiterpenes esters), fatty acid-containing lipids are thus minor components in resin. Argentatins (tetracyclic triterpenes ceto-alcohols, up to 83% of terpenics) are always more concentrated than guayulins; the total of the six identified terpenics makes up to 19% of resin in bark which is also the richest part in resin (10% of dry bark). The saponifiable fraction shows ten identified fatty acids (C10 to C21, mainly saturated), about the double of reported fatty acids in literature (C16 and C18, mainly unsaturated).

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Friday, January 1, 2021

Session Time: 1:00 AM - 2:00 AM

Presentation Time: 1:00 AM - 2:00 AM

Track: Processing@@@Lipid Oxidation and Quality

(3465) Effects of Adsorption on PAHs, Lipid Composition, Oxidation Stability and Antioxidant Capacity of Flavor Sesame Oil

Presenting Author: Longkai Shi - Jiangnan University

In this study, activated clay and two kinds of activated carbons were selected, and the changes of lipid composition, oxidation stability and antioxidant capacity of flavor sesame oils during adsorption process to reduce the risk of polycyclic aromatic hydrocarbons (PAHs) were investigated. The results demonstrated that activated carbon was a promising adsorbent than activated clay when used for the removal of PAHs from sesame oils. Concentrations of BaP and PAH4 in the two activated carbons treated sesame oils were all conformed to the maximum limits set by China and EU, thus indicating that the use of activated carbon to eliminate PAHs during flavor oil purification was highly recommended. Differences of fatty acid, triacylglycerol, and γ -tocopherol profiles among the crude and three treated sesame oils were not significant. However, the contents of phytosterols, lignans, polyphenols, and oxidation stability and antioxidant capacity of the adsorbed sesame oils were significantly decreased when compared with the crude oil, thus demonstrating that adsorption was a double-edged sword to sesame oils. On the bright side, adsorption may reduce the exposure of PAHs so that assure the safety of consumer's health, nevertheless, it may also cause the reductions of minor components, oxidation stability and antioxidant capacity of the sesame oils. These results provided a useful guidance for oil processing enterprise to improve the quality of the sesame oil, indicating that proper adsorbent should be employed in the sesame oil refining process in order to produce a high-class oil product with high nutritional value and low PAHs content.

Monday, June 29, 2020

Session Time: 8:25 AM - 11:20 AM

Presentation Time: 8:55 AM - 9:20 AM

Track: Processing@@@Protein and Co-Products

(3658) Hexan free mechanical extraction by screw pressing as a viable alternative to chemical extraction of oil seeds

Presenting Author: Michal Kavalek, PhD - Farnet AS

The chemical extraction is the most effective way how to obtain crude vegetable oil, but on the other hand screw pressing of oil seeds is becoming increasingly popular. Mechanical extraction (without chemical solvent) by screw pressing has some benefits against chemical extraction such as lower investment cost, lower space requirements, lower safety measures and greater food safety of the products. On the other hand it has yield and capacity limitations. Different screw pressing technologies have different quality of products (crude oil and expellers). Expellers and

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extracted meals are the most common sources of protein in animal nutrition. Nowadays on the market there are expellers and extracted meals available from different technologies with different feeding value. During the study there was analysed relative protein digestibility from soybean, rapeseed and sunflower expellers and extracted meals from different technologies. In general expellers have the same or better relative protein digestibility than extracted meals. Adding dry extruder to process of screw pressing brings some benefit to the process such as increasing feeding value of expellers and increasing crude oil yield. Because of higher oil content expellers have higher energetic value and needs to be seen as different product with higher market price.

Monday, June 29, 2020

Session Time: 11:20 AM - 12:10 PM

Presentation Time: 11:45 AM - 12:10 PM

Track: Processing@@@Protein and Co-Products

(3919) FSMA: Equipment, Cleaning and Sanitization Requirements Within the Food and Beverage Industry

Presenting Author: Dennis M. McCullough, MS, CPP - Process Plus LLC

The subject of the Food Modernization Act (FSMA) is to protect food from intentional adulteration. For the purposes of this review, we will address the FSMA Part L which addresses equipment design and cleaning and sanitization requirements. The FSMA rule identifies possible routes of microbial contamination and sets requirements to prevent or reduce the introduction of pathogens. Equipment, tools, and buildings are identified routes of contamination because they have the potential to contaminate covered produce with pathogens. To reduce the potential for contamination, equipment, tools and facilities must be properly designed and constructed for the necessary cleaning and sanitization procedures. Completing the vulnerability (risk) assessments is the first step in understanding problem areas within existing conditions. This risk assessment is also used to identify potential design flaws within new projects. Facilities are also required to complete a written food defense plan. This plan, in conjunction with completed risk assessments, is important in answering preventative design questions from the FDA. When design flaws or defect procedures are identified, preventative action is crucial to avoid contamination which includes developing and prioritizing equipment standards, facility designs and material and personnel flows. In conclusion, this presentation will review steps for reducing possible contamination from equipment designs; and implementing effective cleaning and sanitization procedures for successful business operations.

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Thursday, July 2, 2020

Session Time: 8:25 AM - 11:45 AM

Presentation Time: 10:55 AM - 11:20 AM

Track: Processing@@@Protein and Co-Products

(4130) A Clean Alternative to Hexane for the Extraction of Oilseeds

Presenting Author: Richard W. Ozer, PE - Crown Iron Works Co

EcoXtract (2-Methyloxolane) is an organically derived solvent that has similar thermal values to hexane and is largely immiscible with water. The product is already recognized as an USDA 100% bio-based product (Bio-preferred label) and will potentially be considered organic. Its plant origin offers the opportunity to produce clean label defatted oilseed that can be used for Human & Feed applications. Testwork has been conducted on a Pilot and Small Production scale on soy and pre-pressed Canola. Test results to date have been quite positive showing low residual oil at similar solvent:feed ratios to Hexane. This paper will discuss these results and provide a comparison of products and utilities compared to Hexane. We will also discuss changes to traditional Hexane Solvent Plant flowsheets and equipment to accommodate the new solvent.

Friday, January 1, 2021

Session Time: 1:00 AM - 2:00 AM

Presentation Time: 1:00 AM - 2:00 AM

Track: Processing@@@Protein and Co-Products

(3918) Food Safety Modernization and the Impact to the Ingredient Industry

Presenting Author: Ken Popham - Process Plus

Most food ingredient production plants were not built as a finished product food production facility. Ingredients were viewed as going into a primary food product and that product would have a downstream process step that would be considered as the critical control point (CCP). Because of the Food Safety Modernization Act (FSMA), all ingredients - even raw ingredients - must be managed as a ready to eat (RTE) product. A HACCP approach must be developed to identify potential sources of adulteration/contamination, and preventative steps developed to minimize the risk to your entire product stream. The product does not have to be proven to be a risk to be considered for a recall. Per the FDA, it is considered a risk 'if it has been prepared, packed, or held under insanitary conditions whereby it may have become contaminated with filth, or whereby it may have been rendered injurious to health'. The modern ingredient production facility must be designed and operated as a finished product food plant. This would include fit and finish of the areas, wash down and sanitization procedures and managing material, personnel and air flows. For the purposes of this presentation, we will evaluate the portions of FSMA Part L which address building design. Once in place, this proposed rule would establish measures that a food facility, including ingredient manufacturers, would be required to implement to protect against the intentional or unintentional adulteration of food.