

# 2022 AOCS Annual Meeting & Expo

## Biotechnology Program

*As of March 23, 2022. Subject to change.*

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### General Biotechnology

#### BIOTECHNOLOGY

*Chairs: Todd Underiner, Procter & Gamble, USA; and Sarah Willett, Kerry Group, USA*

*Monday, May 2, 2022 | 9:55 a.m.–Noon EDT (Atlanta, USA; UTC-4)*

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**Enzyme-based soy processing.** Lu-Kwang Ju\*<sup>1</sup> (**Biotechnology Division Ching Hou Biotechnology Award Winner**), Abdullah Al Loman<sup>2</sup>, Qian Li<sup>3</sup>, S. M. Mahfuzul Islam<sup>4</sup>, Ashwin Sancheti<sup>5</sup>, Md Fauzul Kabir<sup>1</sup>,  
<sup>1</sup>Department of Chemical, Biomolecular, and Corrosion Engineering, University of Akron, United States;  
<sup>2</sup>Technical Development, Biogen, United States; <sup>3</sup>Catalent, United States; <sup>4</sup>Archer Daniels Midland Company, United States; <sup>5</sup>CMC, DermBiont Inc, United States

**Simultaneous loading of (–)-epigallocatechin gallate and ferulic acid in chitosan-based nanoparticles as effective antioxidant and skin-whitening agent.** Guanghui Li\*<sup>1</sup>, Chaoying Qiu<sup>1</sup>, Ning Liu<sup>2</sup>, Xuanxuan Lu<sup>1</sup>, Yong Wang<sup>1</sup>,  
<sup>1</sup>Food Science and Engineering, Jinan University, China (People's Republic); <sup>2</sup>Shaanxi University of Science and Technology, China (People's Republic)

**ISO TC 34/SC 16 Horizontal methods for molecular biomarker analysis—international standards for molecular biomarker analysis/isothermal nucleic acid amplification methods.** Michael Sussman\*,  
*ISO/USDA, AMS, L&P, Agricultural Analytics Division, United States*

**Lipozyme TL IM-catalyzed synthesis of  $\gamma$ -linolenic acid rich triacylglycerol from borage oil as a novel strategy.** Hui su Yoon\*<sup>1</sup>, In-Hwan Kim<sup>2</sup>,  
<sup>1</sup>Department of Integrated Biomedical and Life Sciences, Graduate School, Korea University/BK21FOUR R&E Center for Learning Health Systems, Korea University, Republic of Korea; <sup>2</sup>Korea University, Republic of Korea

**Concentration of eicosapentaenoic acid via *Candida rugosa* lipase-catalyzed esterification with phytosterol and fatty acid from anchovy oil.** Jeanne Kang\*<sup>1</sup>, In-Hwan Kim<sup>2</sup>,  
<sup>1</sup>Department of Integrated

Biomedical and Life Science, Graduate School, Korea University/BK21FOUR R&E Center for Learning Health Systems, Korea University, Republic of Korea; <sup>2</sup>Korea University, Republic of Korea

**Engineering of microalgae toward biodiesel: Facts and prospects.** F. Xavier Malcata\* (**Stephen S. Chang Award Winner**), Department of Chemical Engineering—LEPABE, FEUP, Portugal

## Biosurfactants

### BIOTECHNOLOGY

Joint session with the Surfactants and Detergents Division

Sponsored by Testfabrics Inc.

Chairs: Phil Vinson, Procter & Gamble Co, USA; George Smith, Sasol, USA; and Douglas Hayes, University of Tennessee, USA

Monday, May 2, 2022 | 3:55–6 p.m. EDT (Atlanta, USA; UTC-4)

*The Biosurfactants session highlights a method of synthesizing  $\alpha$ -monostearin for cleaner large-scale production of  $\alpha$ -monoglycerides; the potential of sophorolipids as transport carriers; overview of the properties of oleo-furan surfactants; biopolymer-biosurfactant systems; and molecular simulation for biosurfactant-based cosmetic formulations.*

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**Selective synthesis of alpha monoglycerides by clean method: Techno-economic and environmental assessment.** Ahmad Mustafa\*<sup>1</sup>, Reham Mohsen<sup>2</sup>, Fumiya Niikura<sup>3</sup>, <sup>1</sup>General Systems Engineering, October University for Modern Sciences and Arts (MSA), Egypt; <sup>2</sup>Faculty of Biotechnology, October University for Modern Sciences and Arts (MSA), Egypt; <sup>3</sup>Lion Corporation, Japan

**Sugar for hydrophobes? Fermentation to palm-free detergent alcohols at scale.** Risha Bond\*, Genomatica, Inc., United States

**Oleo-furan surfactants as fully biorenewable, carcinogen-free drop-in replacements for commercial anionic surfactants.** Shawn Eady\*, Sironix Renewables, United States

**The role of sophorolipid as carrier of active substances.** Glen Lelyn Quan\*<sup>1</sup>, Michiaki Araki<sup>1</sup>, Yoshihiko Hirata<sup>2</sup>, Kentaro Matsumiya<sup>3</sup>, Yasuki Matsumura<sup>4</sup>, <sup>1</sup>Biochemical Laboratory, Saraya Co., Ltd., Japan; <sup>2</sup>Product Development Division and Biochemical Laboratory, Saraya Co., Ltd., Japan; <sup>3</sup>Graduate School of Agriculture, Kyoto University, Japan; <sup>4</sup>Research Institute for Sustainable Humanosphere, Kyoto University, Japan

**Biosurfactants and biopolymers: Between interactions, orthogonality and mutual responsivity.** Niki Baccile\*, Chloé Seyrig, Alexandre Poirier, Sorbonne Université, France

**Molecular simulation as a tool for the design of biosurfactant-based cosmetic formulations.** Benjamin Coscia\*<sup>1</sup>, Andrea Browning<sup>1</sup>, Jeffrey Sanders<sup>2</sup>, Mat Halls<sup>1</sup>, <sup>1</sup>Schrodinger, United States; <sup>2</sup>Materials Science, Schrodinger, United States

## Biorenewable Polymers

### BIOTECHNOLOGY

Joint session with the Industrial Oil Products Division

Chairs: Eric Cochran, Iowa State University, USA; and Richard Ashby, USDA ARS ERRC, USA

Tuesday, May 3, 2022 | 7:05–9:30 a.m. EDT (Atlanta, USA; UTC-4)

*The Biorenewable Polymers session features talks covering environmentally friendly coating products using soybean oil; synthesizing monomers with fatty acids; renewable lipid-based micelle nanoparticles*

*as amphiphilic drug carriers; photoinduced reactions to produce composites from biobased monomers; extending the lifespan of roofing shingles with soybean oil-based polymeric coatings; industrial uses of cashew nut shell liquid; and epoxy resins made from epoxidized algal, soybean, and linseed oils.*

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**Cashew NutSell Liquid (CNSL), a promising source of biobased additives and building blocks for the industry.** Benoit Briou\*, Audrey Roy, Lucas Jeco, Adélaïde Gartili; *R&D, Orpia Innovation/ICGM, France*

**Plant oil based radically polymerizable monomers for sustainable polymers.** Sylvain Caillol\*, *ICGM, France*

**Epoxy materials with triglyceride structure.** Zoran S. Petrovic\*, Jian Hong, Dragana Radojic, *Kansas Polymer Research Center, Pittsburg State University, United States*

**Bio-based cationic waterborne polyurethane dispersions from high oleic soybean oil.** Jasna Djonlagic\*, Milica Lovric Vukovic, Jian Hong, Zoran S. Petrovic, *Kansas Polymer Research Center, Pittsburg State University, United States*

**Biobased composites from renewable monomers and cellulosic reinforcements by photoinduced processes.** Sara Dalle Vacche\*, *Department of Applied Science and Technology, Politecnico di Torino, Italy*

**Soybean oil-based polymeric coatings for the rejuvenation of old asphalt shingles.** Nacu B. Hernandez\*, Andrew Becker, Michael Forrester, Eric Cochran, *Chemical and Biological Engineering, Iowa State University, United States*

**Lipid derived block copolymers as amphiphilic nanocarriers for targeted delivery.** Aman Ullah\*, Huiqi Wang, Rehan Pradhan, *AFNS, University of Alberta, Canada*

## New Crops for Oils/Feedstock Engineering

### BIOTECHNOLOGY

Joint session with the Industrial Oil Products Division

*Chairs: Roque Evangelista, USDA ARS NCAUR, USA; and Mahesh Balwant Khot, Farmsow Pvt. Ltd., India*

Tuesday, May 3, 2022 | 1:25–3:30 p.m. EDT (Atlanta, USA; UTC-4)

*New Crops for Oils/Feedstock Engineering topics includes metabolic engineering of oilseeds; potential of Chrysothamnus albidum seed; pennycress as cover crop and source of food and oil; and the applications and potential of Camelina sativa and Carinata.*

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**Carinata: An emerging biofuel feedstock platform.** Rick Bennett\*, *Nuseed, Canada*

**Camelina breeding and development—A Canadian perspective.** Christina Eynck\*, *Specialty Crop Breeding, AAFC, Canada*

**CoverCress—A novel oilseed winter crop with canola-like composition that helps sequester carbon and prevent soil erosion.** Tim Ulmasov\*, *CoverCress Inc., United States*

**Targeted genome editing of industrial oilseed crops to enhance synthesis of functional lipids.** Linah Alkotami\*<sup>1</sup>, Maliheh Esfahanian<sup>2</sup>, Brice Jarvis<sup>3</sup>, Kathleen M. Schuler<sup>4</sup>, Jianhui Zhang<sup>5</sup>, Somnath Koley<sup>6</sup>, Doug K. Allen<sup>7</sup>, Chaofu Lu<sup>8</sup>, John Sedbrook<sup>9</sup>, Timothy Durrett<sup>1</sup>, <sup>1</sup>*Biochemistry and Molecular Biophysics, Kansas State University, United States*; <sup>2</sup>*Plant Biology, Carnegie Institution for Science, United States*; <sup>3</sup>*Illinois State University, United States*; <sup>4</sup>*Biochemistry, Kansas State University, United States*; <sup>5</sup>*Plant Sciences & Plant Pathology Department, Montana State University, United States*; <sup>6</sup>*Donald Danforth*

*Plant Science Center, United States; <sup>7</sup>Agricultural Research Service, U.S. Department of Agriculture/Donald Danforth Plant Science Center, United State; <sup>8</sup>Montana State University, United States; <sup>9</sup>Biological Sciences, Illinois State University, United States*

**Development of dedicated non-food oil crops for industrial oil production through metabolic engineering.** Xueyuan Li, Emelie Ivarson, Li-Hua Zhu\*, *Swedish University of Agricultural Sciences, Lomma, Sweden*

**Viability of utilization of *Chrysophyllum albidum* seed oil as bio-industrial fluid.** Chinedu M. Agu\*<sup>1</sup>, Goziya W. Dzarma<sup>1</sup>, Albert C. Agulanna<sup>2</sup>, Emeka L. Udokporo<sup>2</sup>, <sup>1</sup>*Chemical Engineering, Michael Okpara University of Agriculture, Nigeria; <sup>2</sup>Centre for Environmental Management and Control, University of Nigeria, Enugu Campus, Nigeria*

## Gene Editing Technologies

### BIOTECHNOLOGY

*Chairs: Tim Ulmasov, CoverCress, Inc., USA; and Timothy P. Durrett, Kansas State University, USA*  
Tuesday, May 3, 2022 | 1:25–3:30 p.m. EDT (Atlanta, USA; UTC-4)

*The Gene Editing Technologies session features talks examining issues around genome edited plants in grain and food.*

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**Unlocking the next generation of row crop quality traits through genome editing.** Julia Stevens\*, *Plant Biotechnology, Bayer Crop Science, United States*

**Utility of CRISPR/Cas in accelerating gene discovery in soybean.** Minviluz Stacey\*, *Division of Plant Science and Technology, University of Missouri, United States*

**CRISPR/Cas9-based editing of OsNF-YC4/GmNF-YC4 promoter yields high-protein crops.** Ling Li\*, *Biological Sciences, Mississippi State University, United States*

**Update on the revised USDA biotech regulation.** Neil Hoffman\*, *Animal Plant Health Inspection Service/Biotechnology Regulatory Services, United States*

**Detection of genome edited products—is it CRISPR?** Raymond D Shillito\*, *Regulatory Science, BASF (United States), United States*

## Biocatalysis—Enzyme Processing

### BIOTECHNOLOGY

*Chairs: Jun Ogawa, Kyoto University, Japan; and Lu-Kwang Ju, The University of Akron, USA*  
Tuesday, May 3, 2022 | 3:55–6 p.m. EDT (Atlanta, USA; UTC-4)

*The Biocatalysis—Enzyme Processing session features talks on using phospholipases for enzymatic degumming; synthesizing oleochemicals by esterification using Eversa immobilized lipase; and proteins, lipids, and potential prebiotic oligosaccharides from chickpeas for industrial applications.*

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**Production of value-added oleochemicals via Eversa immobilized lipase-catalyzed esterification.** In-Hwan Kim\*, Dongchan Oh, Suhyeon Choi, *Korea University, Republic of Korea*

**Immobilized lipase in the synthesis of high purity medium chain diacylglycerols using a bubble column reactor: Characterization and application.** Jiazi Chen\* (*Biotechnology Division Student Award Winner*), *Jinan University, China (People's Republic)*

**Applications and benefits of phospholipase a enzymes in seed oil processing.** Ying Zha<sup>1</sup>, Nikita Iltchenko\*<sup>1</sup>, Jesse Beam<sup>2</sup>, <sup>1</sup>*DSM Food & Beverage, Netherlands*; <sup>2</sup>*DSM Food & Beverage, United States*

**Temperature effects on enzyme stability for carbohydrate hydrolysis of soy materials.** Md Fauzul Kabir\*, Lu-Kwang Ju, *Chemical, Biomolecular, and Corrosion Engineering, The University of Akron, United States*

**Bioprocessing strategies to improve the extractability and functional properties of lipids, proteins, and carbohydrates from full-fat chickpea flour.** Fernanda Furlan Goncalves Dias\*, Kazunori Machida, Juliana Leite Nobrega De Moura Bell, *University of California, Davis, United States*

## Breeding and Biotechnology for Improved Quality of Food Proteins

### BIOTECHNOLOGY

Joint session with the Protein and Co-Products Division

*Chairs: Phil S. Kerr, Prairie AquaTech, LLC, USA; and Long Zou, Bunge Creative Solutions Center, USA*

Wednesday, May 4, 2022 | 7:25–9:30 a.m. EDT (Atlanta, USA; UTC-4)

*The Breeding and Biotechnology for Improved Quality of Food Proteins session includes soybean varieties with desirable carbohydrate fraction; ultra-high protein soybeans; modifying oil and protein quality in hemp; methionine content in soybean; and hydrolysates from sunflower proteins.*

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**High-yield soybean lines with improved seed protein and oil balance.** George Graef\*, *Dept. of Agronomy & Horticulture, University of Nebraska-Lincoln, United States*

**Ultra-high protein soybeans for food and aquaculture.** Michael Lassner\*, *Amfora, Inc., United States*

**Developing high yielding soybean varieties with desirable carbohydrate fraction for enhancing nutrition.** Henry T. Nguyen\*, Pengyin Chen, Tri D. Vuong, Haiying Shi, Dongho Lee, Ali Md Alikat, *Plant Science & Technology, University of Missouri, United States*

**Evaluating breeding and management solutions for methionine content in soybean.** William M. Singer\*<sup>1</sup>, Zachary Shea<sup>2</sup>, Dajun Yu<sup>2</sup>, Keren Brooks<sup>1</sup>, Mark Reiter<sup>1</sup>, David L. Holshouser<sup>1</sup>, Haibo Huang<sup>3</sup>, Rouf Mian<sup>4</sup>, Maria L. Rosso<sup>1</sup>, Bo Zhang<sup>1</sup>, <sup>1</sup>*School of Plant and Environmental Sciences, Virginia Tech, United States*; <sup>2</sup>*Virginia Tech University, United States*; <sup>3</sup>*Food Science and Technology, Virginia Tech, United States*; <sup>4</sup>*Soybean & Nitrogen Fixation Unit, USDA-ARS, United States*

**Modifying oil and protein quality in hemp using modern conventional breeding approaches.** Rich Fletcher\*, *New West Genetics, United States*

**Production of highly soluble and functional hydrolysates from sunflower proteins.** Sophie Beaubier\*<sup>1</sup>, Sara Albe Slabi<sup>2</sup>, Odile Mesieres<sup>3</sup>, Marine Bianeis<sup>2</sup>, Olivier Galet<sup>2</sup>, Romain Kapel<sup>3</sup>, <sup>1</sup>*University of Lorraine, LRGP CNRS, France*; <sup>2</sup>*Groupe AVRIL, France*; <sup>3</sup>*LRGP CNRS UMR7274, France*

## Fermentation

### BIOTECHNOLOGY

Joint session with the Processing Division

*Sponsored by Desmet Ballestra North America, Inc.*

*Chairs: Tsunehiro Aki, Hiroshima University, Japan; and Mahesh Balwant Khot, Farmsow Pvt. Ltd., India*

Wednesday, May 4, 2022 | 9:55 a.m.–Noon EDT (Atlanta, USA; UTC-4)

*The Fermentation session includes talks on isolating microorganisms in crude glycerol to measure fatty acid composition; using yeasts to produce biodiesel and healthier metabolites; enhancing oil production from yeast; biodiesel production using agro-waste; and improving the quality of pennycress meal.*

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**Fungal bioprocessing to improve quality of pennycress meal as potential feeding ingredient for monogastric animal.** Bo Hu\*<sup>1</sup>, Xiao Sun<sup>1</sup>, David Marks<sup>2</sup>, Bo Hu<sup>1</sup>, <sup>1</sup>*Bioproducts and Biosystems Engineering, University of Minnesota, United States*; <sup>2</sup>*Plant and Microbial Biology, University of Minnesota, United States*

***Rhodotorula mucilaginosa* R2: A potent oleaginous yeast isolated from traditional fermented food as a promising platform for the production of lipid-based biofuels, bioactive compounds and other value-added products.** Pritam Bardhan\*, Manabendra Mandal, *Department of Molecular Biology & Biotechnology, Tezpur University, India*

**Genetic modification to enhance single cell oil production in the oleagineous yeast *Rhodotorula mucilaginosa*.** Sheetal Bandhu\*<sup>1</sup>, Debashish Ghosh<sup>2</sup>, <sup>1</sup>*Kusuma School of Biological Sciences, Indian Institute of Technology, Delhi, India*; <sup>2</sup>*Biochemistry and Biotechnology, CSIR-Indian Institute of Petroleum, India*

**Studies on filamentous fungus *Fusarium* sp. Accumulating hydroxy fatty acids.** Eiji Sakuradani\*, Kai Yoshida, Naomi Murakawa, Takaiku Sakamoto, *Tokushima University, Japan*

**Process optimization for biodiesel production using agro-waste substrate.** Ameeta Ravikumar\*<sup>1</sup>, V. Ravi Kumar<sup>2</sup>, Rashmi Bed<sup>1</sup>, <sup>1</sup>*Institute of Bioinformatics and Biotechnology, Savitribai Phule Pune University, India*; <sup>2</sup>*Chemical Engineering and Process Development Division, CSIR-National Chemical Laboratory (CSIR-NCL), India*

**Utilization of sugar cane bagasse as a substrate for fatty acid production by *Aurantiochytrium* sp.** Kenshi Watanabe\*, *Hiroshima University, Japan*

## Biotechnology Poster Session

*Chair: Sarah Willett, Kerry Group, USA*

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**BIO-01 An efficient and environment friendly bio-based polyols through liquefaction: Liquefaction temperature and catalyst concentration optimization and utilized for rigid polyurethane foams.** Chiragkumar Patel\*<sup>1</sup>, Nikhil Dhore<sup>2</sup>, <sup>1</sup>*SICART, India*; <sup>2</sup>*IICT Hyderabad, India*

**BIO-02 Effect of oil carbon chain length on the physical stability and bioactivity of nanoemulsion delivery systems incorporating lipophilic ingredients.** Xin Guo\*<sup>1</sup> (**Biotechnology Division Student Award Winner**), Ming Chang<sup>2</sup>, <sup>1</sup>*University of Massachusetts, Amherst, United States*; <sup>2</sup>*Jiangna University, China (People's Republic)*

**BIO-03 Encapsulation of melittin in bicontinuous microemulsions for topical delivery.** Madison Oehler\*<sup>1</sup>, Douglas Hayes<sup>1</sup>, Doris D'Souza<sup>2</sup>, <sup>1</sup>*Biosystems Engineering and Soil Science, University of Tennessee, Knoxville, United States*; <sup>2</sup>*Food Science and Technology, The University of Tennessee Knoxville, United States*

**BIO-04 International standards for food authenticity and allergen detection from ISO TC 34/SC 16 horizontal methods for molecular biomarker analysis.** Michael Sussman\*, *ISO/USDA, AMS, L&P, Agricultural Analytics Division, United States*



**BIO-05 Measurement of volumetric mass transfer coefficient in lab-scale stirred tank reactors: Is there a point of diminishing returns for impeller speed and gas flowrate?** Robert Bertrand\*<sup>1</sup>, Emmanuel Revellame<sup>2</sup>, Lisa Stephanie Dizon<sup>1</sup>, Kristel Gatdula<sup>2</sup>, Remil Aguda<sup>2</sup>, <sup>1</sup>*Chemical Engineering, University of Louisiana at Lafayette, United States*; <sup>2</sup>*University of Louisiana at Lafayette, United States*

**BIO-06 Variation in cellulase production during solid and submerged state fermentation of raw and processed canola meal by *Aureobasidium pullulans*, *Neurospora crassa*, and *Trichoderma reesei*.** Ahmad F. Alhomodi\*<sup>1</sup>, William Gibbons<sup>2</sup>, Bishnu Karki<sup>2</sup>, <sup>1</sup>*Dept. of Biology and Microbiology, South Dakota State University, United States*; <sup>2</sup>*South Dakota State University, United States*

**BIO-07 A Comparative Analysis of NanoLuc Luciferase and Alkaline Phosphatase as Reporter Proteins for Phage-Based Pathogen Detection.** Joey Talbert \*, Shalini Wijeratne, Arubdan Bakshi, *Department of Food Science and Human Nutrition, Iowa State University, United States*

**BIO-08 Characterization of monoolein liquid crystals using oscillatory rheology and strain rate frequency superposition.** Shweta Mistry\*<sup>1</sup>, Philipp Fuhrmann<sup>1</sup>, Dérick Rousseau<sup>2</sup>, <sup>1</sup>*Ryerson University, Canada*; <sup>2</sup>*Department of Chemistry and Biology, Ryerson University, Canada*

**BIO-09 CRISPR/Cas9-targeted mutagenesis of KTI1 and KTI3 to reduce trypsin inhibitors in soybean seeds.** Zhibo Wang\*<sup>1</sup>, Zachary Shea<sup>1</sup>, Maria L. Rosso<sup>2</sup>, Chao Shang<sup>1</sup>, Jianyong Li<sup>1</sup>, Patrick Bewick<sup>1</sup>, Bingyu Zhao<sup>1</sup>, Bo Zhang<sup>2</sup>, <sup>1</sup>*Virginia Tech, United States*; <sup>2</sup>*School of Plant and Environmental Sciences, Virginia Tech, United States*

**BIO-10 Effects of fungal fermentation on cellulase activity along with the solubility and protein yield on different economically important substrates.** Mohammad Raihan\*<sup>1</sup>, Ahmad F. Alhomodi<sup>2</sup>, Mark Berhow<sup>3</sup>, William Gibbons<sup>1</sup>, Bishnu Karki<sup>1</sup>, <sup>1</sup>*South Dakota State University, United States*; <sup>2</sup>*Dept. of Biology and Microbiology, South Dakota State University, United States*; <sup>3</sup>*USDA, United States*

**BIO-11 Effects of growth conditions on the bacterial conversion of methane to lipids.** Lisa Stephanie Dizon\*<sup>1</sup>, Robert Bertrand<sup>1</sup>, Mark Zappi<sup>1</sup>, Rafael Hernandez<sup>1</sup>, William Holmes<sup>2</sup>, Dhan Lord Fortela<sup>1</sup>, Emmanuel Revellame<sup>3</sup>, <sup>1</sup>*Chemical Engineering, University of Louisiana at Lafayette, United States*; <sup>2</sup>*Energy Institute of Louisiana, University of Louisiana at Lafayette, United States*; <sup>3</sup>*Industrial Technology, University of Louisiana at Lafayette, United States*

**BIO-12 In-situ direct transesterification process optimization for biodiesel production from *Aspergillus terreus* wet biomass.** Rashmi Bed\*<sup>1</sup>, Ameeta Ravikumar<sup>1</sup>, V. Ravi Kumar<sup>2</sup>, <sup>1</sup>*Institute of Bioinformatics and Biotechnology, Savitribai Phule Pune University, India*; <sup>2</sup>*Chemical Engineering and Process Development Division, National Chemical Laboratory, Pune, India*

**BIO-13 Lignin-alginate-based biopolymers for the bioencapsulation of *Rhizobium*.** Toby A. Adjuik\*, Sue E. Nokes, Michael D. Montross, *Biosystems and Agricultural Engineering, University of Kentucky, United States*

**BIO-14 Novel strategy for synthesis of stearidonic acid enriched triacylglycerol from ahiflower seed oil via a two-step enzyme reaction.** Yu Jin Lee\*<sup>1</sup>, Changhwan Ju<sup>2</sup>, In-Hwan Kim<sup>2</sup>, <sup>1</sup>*Department of Integrated Biomedical and Life Sciences, Graduate School, Korea University/BK21FOUR R&E Center for Learning Health Systems, Korea University, Republic of Korea*; <sup>2</sup>*Korea University, Republic of Korea*

**BIO-15 Optimizing corn steep liquor as fermentation media for the production of recombinant antifreeze proteins.** Bibek Byanju\*<sup>1</sup>, Buddhi Lamsal<sup>2</sup>, Swastik Sen<sup>3</sup>, Thomas Mansell<sup>3</sup>, <sup>1</sup>*Food Science and*

*Human Nutrition, Iowa State University, United States; <sup>2</sup>Iowa State University (ISU), United States; <sup>3</sup>Department of Chemical and Biological Engineering, Iowa State University, United States*

**BIO-16 Phosphatidylglycerol-specific phospholipase C from *Amycolatopsis* sp. NT115: Biochemical characterization and heterologous expression.** Daisuke Sugimori\*, Kiyoto Kajiyama, Shunsuke Kawashima, Yuho Matsumoto, *Fukushima University, Japan*

**BIO-17 Probiotic fermentation to improve nutritional profile in extruded or ground corn and wheat brans.** Bibek Byanju\*<sup>1</sup>, Buddhi Lamsal<sup>2</sup>, <sup>1</sup>*Food Science and Human Nutrition, Iowa State University, United States; <sup>2</sup>Iowa State University (ISU), United States*

**BIO-18 Statistical optimization of media for enhancing intracellular lipid content in *Yarrowia lipolytica* NCIM 3589 grown on waste cooking oil for biodiesel production.** Shubhangi Jagtap\*<sup>1</sup>, Ameeta Ravikumar<sup>1</sup>, Gouri Raut<sup>2</sup>, V. Ravi Kumar<sup>3</sup>, <sup>1</sup>*Institute of Bioinformatics and Biotechnology, Savitribai Phule Pune University, Pune, India; <sup>2</sup>Bioenergy, Agharkar Research Institute, India; <sup>3</sup>Chemical Engineering and Process Development Division, CSIR-National Chemical Laboratory (CSIR-NCL), India*

**BIO-19 Synthesis of pinolenic acid enriched triacylglycerol from pine nut oil via a two-step consecutive enzyme reaction.** Mi Soon Park\*<sup>1</sup>, Yu Jin Lee<sup>1</sup>, In-Hwan Kim<sup>2</sup>, <sup>1</sup>*Department of Integrated Biomedical and Life Sciences, Graduate School, Korea University/BK21FOUR R&E Center for Learning Health Systems, Korea University, Republic of Korea; <sup>2</sup>Korea University, Republic of Korea*