Keynote Forum
August 16, 2018

Industrial Biotechnology 2018




International Conference on

Industrial Biotechnology and Bioprocessing

August 16-17, 2018 | Copenhagen, Denmark

Birgitte K Ahring

Washington State University, USA

Biochemical production of aviation biofuels or bio-jet precursors from lignocellulosic biomass materials

Despite continuous improvements in the efficiency of the jet engine, the world consumption of jet fuel is constantly growing ca. 5% a year and is expected to reach a total of 385 million tons in 2035 up from 243 mill tons today. Even the most positive outlook for crude oil production is still a pessimistic scenario for the aviation industry. Jet fuel is a specific mid-range distillate and this fraction is only accounting for 4-5% of the initial crude oil. To meet the aviation industries need for fuels in the future along with their targets for reducing the carbon footprint, solutions for large-scale production of aviation biofuels is in focus right now.

In the presentation, I will discuss some current solution for producing aviation biofuels such as the Alcohol to Jet pathway of producing cellulosic ethanol, butanol and propanol by fermentation of cellulosic sugars followed by catalytic upgrading to bio-jet. While different mutant of yeast is the main biocatalyst for the alcohol production, I will further show some new pathways from our laboratory based on homo-lactic acid fermentation with Bacillus strains as well as mixed acids production with microbial consortia. Finally, I will show results on direct fermentation of biomass sugars to jet fuels components using mutant of Aspergillus carbonarius engineered with genes from blue-green bacteria.

Speaker Biography

Birgitte K Ahring is a Battelle Distinguished Professor at Washington State University. During her years at WSU she established a new line of research in a dedicated building for bio-products research further including the biomass group out of Pacific Northwest National Laboratory, PNNL. Her research group has worked intensively for years on biorefinery solutions to the production of biofuels and bio-products with a focus on tailoring biocatalyst and optimization of fermentation to products. Besides, she is the inventor of the advanced wet explosion pretreatment process, a process, which has been found to be superior, for making biomass materials available for further processing to bio-products and biofuels. This process is now in industrial scale with a planned major expansion over the coming years. She has published more than 400 papers, has 22801 citations and an H-factor of 79.

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Søren Kjærulff

FermBiotics, Denmark

Fermented canola and seaweed feed and food products – prebiotics, probiotics and bioactives

FermBiotics and Fermentationexperts have developed several fermented plant and seaweed products for pigs, poultry and human health. The products consist of prebiotics, probiotics and bioactives from the fermented plant and seaweed material. We have demonstrated very good in vitro anti-microbial and anti-inflammatory activities of the fermented material. A pig trial shows that fermented feed called EP100i containing fermented canola can replace zinc oxide in pig's feed. The European Commission (EC) has voted in favour of a ban on the veterinary use of zinc oxide in feed. An additional pig trial showed a high (58%) reduction of LDL-cholesterol in pigs given 4 % EP100i feed compared with normal feed. We have demonstrated positive gut microbiome modulation in several animal models. FermBiotics will in collaboration with Silkeborg Hospital, Denmark in the EU project Macro Cascade run a randomized double-blinded matched cross trial using a dose of 5 g fermented canola and seaweed material. The clinical trial will be performed in N=80 human patients with mild-moderate state of Inflammatory Bowel Disease (IBD) and/or Spondyloarthropathy (SPA) including both gender.

Speaker Biography

Søren Kjærulff is currently CEO of Fermbiotics and CTO of Fermentationexperts. He is responsible for development of fermented plant and macroalgae food and feed products with microbiome modulatory activity and for introducing the product to the market, investigate and develop its functionality, identify the regulatory requirements, as well as go-to-market strategies. He was the former senior director of biopharmaceuticals R&D at Novozymes and responsible for anti-microbial and anti-inflammatory peptides and albumin half-life extension of peptide drugs. He also served as the former vice president of R&D at Pantheco and Santaris Pharma.

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Dongzhi Wei

East China University of Science and Technology, China

A new era of biocatalysis and biotransformation: Tailor-making biocatalyst towards bioproducts

Manufacturing of bioproducts, such as pharmaceutics, food and cosmetic additives, chemicals etc., has stepped into a new era, where cell factory or molecular machine will play more and more important role for meeting the requirements of mankind. In the recent years, tailor-design has been paid much attention in the area of biosynthesis and biotransformation since it will deeply influence the bioprocess. By means of combination of the advanced methods and techniques coming from different discipline, such as bioinformatics, computational biology, molecular biology, enzyme engineering, biocatalysis, synthetic biology and so on, a novel enzyme could be created, an existing enzyme could be redesigned and reconstructed, even a microorganism could be reedited and reassembled towards the expected valuable compound. In this presentation, some established cases will be shared and analyzed.

Speaker Biography

Dongzhi Wei has completed his PhD in 1989 from East China University of Science and Technology, China. He is the director of New world Institute of Biotechnology and professor of Biotechnology in East China University of Science and Technology. He has over 200 publications that have been cited over 6000 times, and his publication H-index is 34 and has been serving as editorial board members of 5 reputed Journals.

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Heimann K

Flinders University, Australia

Marine Biotechnology – drivers for the aquaculture industry

The world population is predicted to expand from 7 to ~9 billion people by 2050 which is likely to result in significant increased demands for food (70%), fuel (50%) and fresh water (30%). Feeding the growing world population will require increases in agricultural crop productivities as arable land resources are limited and continued urbanization and industrialization has led to declines in Australia's farmland over the last four decades, following world trends. Increasing crop productivities is further challenged by predicted freshwater resource scarcity and greenhouse gas (GHG)-induced climate instability, i.e. the increase and/or severity of 'freak' weather events, such as storms, prolonged droughts etc.. Maintaining and increasing Australian crop productivities will inevitably require, fertilisation, the production of which was estimated to contribute 1.2% of the total GHG emissions due to energy requirements. Algae are heralded as the potential saviors of the world's ailments due to photosynthetic cultivation on non-arable land using non-potable water (saline, brackish, industrial waste waters). Algal cultivation remediates CO_2 GHG pollution (1.83 t CO_2 per t biomass dry weight) and nutrient- or metal-rich waste waters. Among the various algal products that can be derived from the biomass, fertilizer production is an immediate and readily implementable product pathway offering potential for regional agricultural communities to become self-sufficient and independent of costly imports. This key-note will compare productivities of traditional and novel cultivation and processing pathways highlighting where biotechnological production processes can improve traditional aquaculture and generate new market opportunities for expansion of aquaculture into hitherto non-traditional aquaculture markets.

Speaker Biography

Heimann K is a recognized leader in designing, enabling, implementing and advancing industry-driven research on closed system approaches using high-yield microbes in environmental, aqua and agricultural and commercial applications for developing renewable products and sustainable industries. She has extensively in peer-reviewed scientific journals, including Nature, 91 journal articles (citations >2,500), 5 books and 11 book chapters, leading to a H-index of 27. Her research has won many awards, the NQ Corporate Business Women Award 2011 and the JCU Advisor of the Year Award 2016, being the latest. She is the president of ASPAB, associate editor of Botanica Marina, and has served on the science and education committee of the Advanced Manufacturing Cooperative Research Centre (AMCRC) and the tarong science steering committee for microalgae GHG emission abatement at coal-fired power stations.

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