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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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