

AVIATION BIOFUELS: HOW ARE ENZYMES DEEMED TO PLAY A CRITICAL ROLE IN THE DEVELOPMENT OF SUSTAINABLE SOLUTIONS?

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Key Words: aviation, biofuel, biomass, jet fuel, sustainability.

In an increasingly carbon constrained world, the aviation industry is under considerable pressure from regulators and the flying public to improve its environmental performance. This industry has come together to set collaborative and ambitious goals to achieve by 2050 the reduction by 50% of its greenhouse gas emissions, compared to the 2005 base line. Along with airplane technology and operational efficiency, the development of sustainable aviation biofuels constitutes one of the key levers by which these objectives can be met. Significant efforts are underway to mature and deploy a range of technologies for the production of sustainable aviation fuels. Such solutions seek not only environmental and societal sustainability but also performance and cost effectiveness. Across this technology landscape and considering the potential routes to convert biomass into aviation fuel, enzyme can make the difference in addressing some of the corresponding challenges. Among the current sugar- and lipid-based aviation biofuels available so far, the engineering of enzymes has been already contributing greatly to the development of the corresponding technology pathways. This, together with the recent advances in synthetic biology, has led in particular to the design of fine-tuned microbial catalyst able to convert sugars into biofuel precursors. Novel or improved enzyme functionalities are also necessary to further enhance the commercial prospects for sustainable biofuels for aviation, notably by enabling the use of alternative lower cost feedstocks.