Session 6	Microbes and gaseous feedstocks
Pitch Title	Developing the World's Potentially Fastest CO_2-to-Triacylglycerol Fermentation
Company	COLIPI GmbH
Speaker	Maximilian Webers
Keywords feedstock	CO2, C1-molecules, H2, O2, carbon dioxide, hydrogen, oxygen, knallgas, industrial off-gas
Keywords technology	Biological Carbon Utilization, Aerobic Gas Fermentation, Precision Fermentation, Strain Engineering, Bioprocess Engineering, Power-to-Liquid (PtL)
Keywords End-Product	Triacylglycerols, Climate Oil™, HEFA-ready Hydrocarbons for SAF, Proteins

Abstract:

Industries emitting carbon dioxide (CO_2) are facing rising costs due to CO_2 certificate trading and sequestration requirements. But what if CO_2 processing could one day be transformed into a profit center? Our goal is to deliver a commercially viable carbon upcycling solution.

We are developing what has the potential to be the world's fastest and most energy-efficient biological CO_2 upcycling process. Built on proprietary extremophile hydrogen-oxidizing bacteria that we are engineering for optimal performance, and an innovative aerobic gas fermentation bioprocess, our approach aims to enable low-CAPEX, safe, and scalable handling of H_2, O_2, and CO_2 gases. With continuous, unsterile fermentation, we foresee reduced OPEX as a major operational benefit.

Our research shows promising lab evidence that this process will be profitable, driven by direct use of CO_2 without conversion to carbon monoxide (CO) and by producing high-value molecules like C16/C18 triacylglycerols, which offer significant market potential compared to C2 or C3 molecules. These triacylglycerols could be suited for high-demand applications in cosmetics, food, and feed industries and integrate seamlessly into chemical processes like Hydrotreated Esters and Fatty Acids (HEFA), which converts feedstocks into Sustainable Aviation Fuel (SAF) by refining longer hydrocarbons.

With realistic hydrogen cost assumptions, our process shows potential to transform CO_2 emissions into a valuable resource for multiple industries.

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