Scaling up Arrested Methanogenesis Technology for Sustainable Aviation Fuel Production

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Topic: 1

BETO subprogram area: Conversion

Period of Performance: 18 months

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Abstract: Resource recovery from waste streams is crucial to achieve environmental sustainability via the circular economy. This requires the development of next-generation waste treatment technologies to produce new chemicals and fuels from carbon-rich organic waste streams. From our work to date in a BETO-EERE-DOE project, we developed an innovative organic acid (aka short chain carboxylic acid or volatile fatty acid (VFA)) production process (US Patent. App # 62/985,853) for converting low-value or negative-value organic waste streams into high-value VFAs, such as butyric acid. Demand for sustainable aviation fuel (SAF) has been growing significantly, and decarbonizing the aviation sector is imperative. High-purity VFAs derived from fermentation and separation processes represent an essential step of SAF production. We propose to scale up the arrested methanogenesis (AM) process from TRL 4 to TRL 6 to accelerate the deployment of the SAF production technologies. The proposed project is well aligned with BETO's mission of developing clean energy technologies that produce SAF from low carbon intensity feedstocks to produce 3 billion gallons per year of domestic sustainable aviation fuel production that achieve a minimum of a 50% reduction in life cycle greenhouse gas emissions (GHG) compared to conventional fuel by 2030 and 100% of projected aviation jet fuel use, or 35 billion gallons of annual production, by 2050.