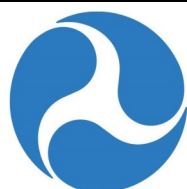


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U.S. Department
of Transportation



Title: Development of Sustainable Hybrid Gasification-Syngas Fermentation Process for Alcohol Production

DR. HASAN ATIYEH

Project Goal

Hybrid gasification-syngas fermentation technology is promising for cellulosic alcohol production from all organic biomass content, including lignin. However, high medium cost and mass transfer limitation are challenges for this process that reduce its efficiency and feasibility. A novel integrated and sustainable process is proposed to address these issues and move the hybrid technology towards commercialization. The overall goal of the project is to develop sustainable and feasible bioconversion of switchgrass into ethanol.

The objectives are:

- (1) Generation and characterization of gasification products.
- (2) Development and optimization of syngas fermentation medium and operation parameters.
- (3) Estimation of production cost and evaluation of a proof of concept for the integrated process.

Expected Outcomes

The hybrid technology when further developed with Sun Grant Program support, is expected to reduce the production cost of cellulosic ethanol by \$0.16 per gallon compared to saccharification-fermentation. This will increase the profitability of biorefineries. If biofuel producers adopt the hybrid technology to produce 25% of the mandated 16 billion GPY renewable transportation fuels (i.e., 4 billion GPY), a projected savings of over \$650 million per year can be achieved due to the use of 13.1 million tons less biomass with the hybrid technology.



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