



U.S. Department of  
Agriculture  
National Institute of  
Food & Agriculture



Project Title: Butanol Production with High Yield and Carbon Conversion Using Novel Biocatalysts

## DR. HASAN ATIYEH

### Project Goal

The overall goal of this project is to increase butanol yield by more than 30% producing up to 40 g/L butanol, or 90 g/L total ABE, and improve the economics of production via the integrated novel conversion process and utilization of lignocellulosic biomass and CO<sub>2</sub> (greenhouse gas, GHG).

### Specific Objectives:

1. Develop butanol fermentation in two-stage reactors with and without in situ ABE recovery.
2. Investigate butanol fermentation with the co-culture in a single bioreactor with and without in situ ABE recovery.
3. Integrate LDMICs tolerance genes (LTG) into the chromosome of *Cb* to increase catalytic proficiency of lignocellulosic biomass conversion to butanol.

### Expected Project Outcomes

Successful completion of this project will involve development of a novel biocatalytic process with increased conversion efficiency to make biofuels and biobased products. At the conclusion of this project, the factors that allow both microorganisms to thrive in a co-culture environment and the reactor operating parameters that result in maximum butanol productivity and yield will be identified. A process for butanol production from lignocellulosic biomass with high yield and carbon conversion efficiencies compared to current technologies will be developed.



### PI:

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**End Date: 08/31/2018**