

SUMMARY / ABSTRACT FOR PUBLIC RELEASE

Title – Development of *Bacillus* as an industrial host for the microbial production of biopolymers

Applicant – ZymoChem, Inc.

Principal Investigator – Harshal Chokhawala, CEO; ZymoChem, Inc.

Major Participants – ZymoChem; Oak Ridge National Lab; Lawrence Berkeley National Lab

Project Description

The United States holds great potential for the use of lignocellulosic biomass feedstocks, where more than 1 billion tons of non-food biomass are available annually for producing energy-related products and other industrial bioproducts. This project focuses on the development of a bio-based process that is tailored for utilizing sugar-rich feedstocks derived from lignocellulosic biomass for the production of industrially desired bioproducts. Specifically, we aim to develop *Bacillus* as an industrial host for making an environmentally-safe, non-toxic, biodegradable biopolymer from lignocellulose-derived C5 and C6 sugars. ZymoChem will work with the Agile BioFoundry to leverage key capabilities within ORNL (genetic transformation and tool development) and LBNL (–omics capabilities, process integration, and bioprocess scale-up). Collaborative efforts will be geared toward (1) developing the genetic and metabolic engineering tools necessary for engineering industrially desired *Bacillus* strains, (2) engineering ZymoChem’s carbon-conserving biosynthetic pathway in *Bacillus* strains to produce the target biopolymer in a high-yield manner, and (3) process development and scale-up of *Bacillus* fermentations to produce the biopolymer from lignocellulosic sugars at high TRY metrics and at the 300 L scale. The successful completion of the project will greatly accelerate ZymoChem’s endeavors toward commercializing a low-cost bioprocess for producing bio-based polymers that offer significant environmental and performance benefits as a more sustainable, eco-friendly alternative to existing petroleum-based alternatives currently being used in applications exceeding \$10 billion/yr across a spectrum of industries.