ABPDU

ADVANCED BIOFUELS AND BIOPRODUCTS PROCESS DEVELOPMENT UNIT

Todd Pray

NCIFT – May 8, 2018

http://abpdu.lbl.gov/

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BERKELEY LAB
Lawrence Berkeley National Laboratory

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

ABPDU enabling biofuel & bioproduct commercialization

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- 15,000 square foot Development & Demonstration Lab established by American Recovery and Reinvestment Act funds in 2009
- Work closely with DOE EERE's BioEnergy Technologies Office (BETO)

- A bio-process research incubator / accelerator – industry-friendly IP rights, cost-recovery project fee structure, experienced team, and Bay Area location

Broad product and industry collaborator base

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Biofuels & biomass | Materials & chemicals | Food & health | Environment

Former contract partners

TOTAL COMMITTED TO BETTER ENERGY
AFINGEN
Visolis
ardra
Es-BioSolutions, Inc
FATER SpA
UNITED CATALYST
RHO Renewables, Inc.
zymergen
Pareto Biotechnologies
RIPPLE FOODS
Hampton Creek
Recology WASTE ZERO
ILIUM ECHNOLOGIES
Sylvatex
LYGOS
Kiverdi
Aequor

Ongoing

Microvi BIOTECHNOLOGIES
Mosaic Materials
GINKGO BIOWORKS™ THE ORGANISM COMPANY
ZYMOCHEM
Clara Foods
Perfect Day
HelioBioSys, Inc.
greenlight BIOSCIENCES
GELTOR
Bolt Threads
CHECKERSPOT DESIGNED MATERIALS INNOVATION
INDIE BIO
SUGARLOGIX
MANGO MATERIALS
KALION, INC.
AMYRIS

Bench-scale & (pre)-pilot process prototyping

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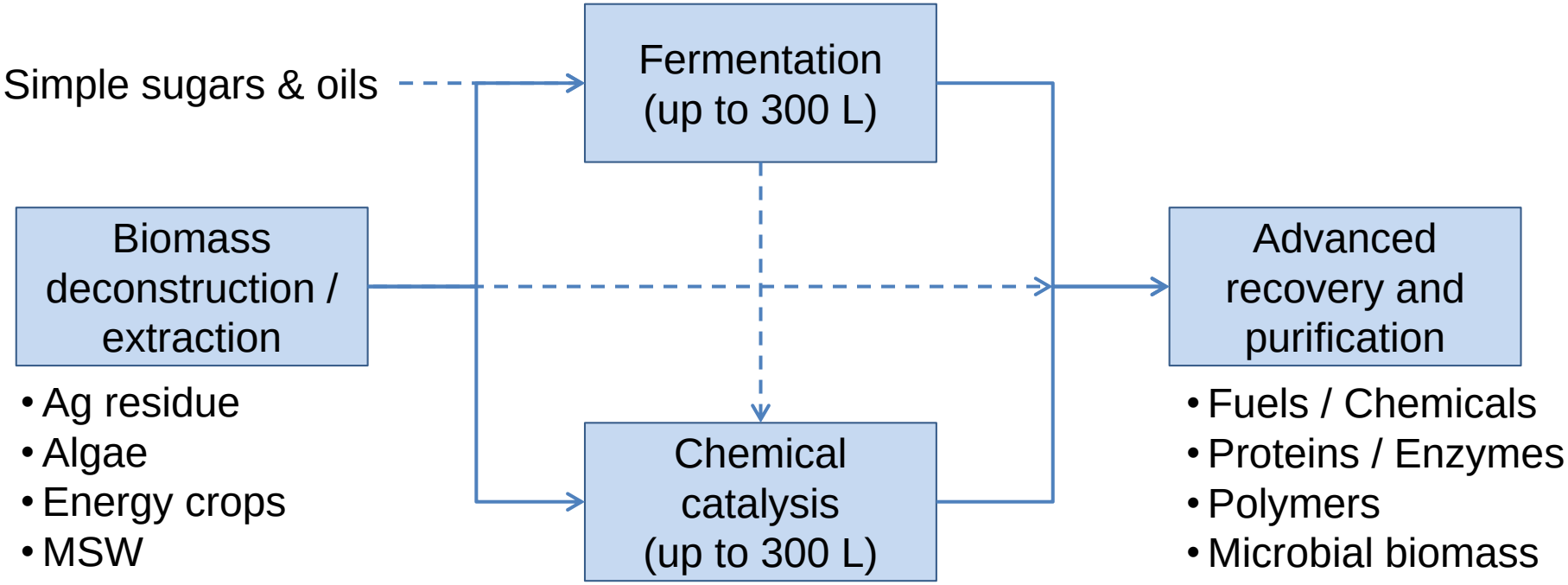
- Process demonstration, integration and techno-economic analysis across varied bio-process configurations, feedstocks and products



- Can focus on individual unit operations or several processes in succession

Facility at a glance – from bench-to-pilot scale

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The “why” - addressing gaps with our partners

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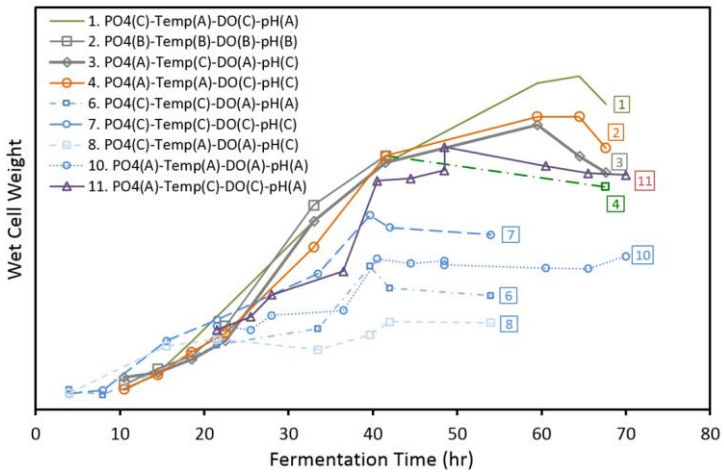
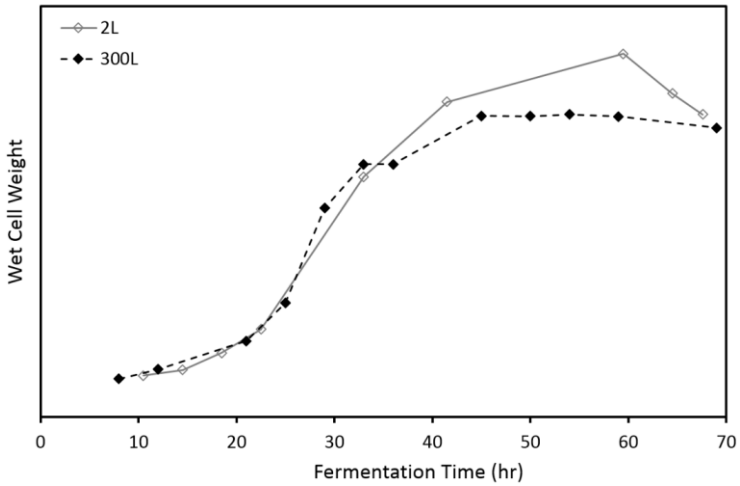
- **Transition from lab- to bench-scale bioreactor process development**
  - Cell bank and seed train
  - Media formulation and raw materials handling
  - Technology transfer – inbound and outbound
- **Analytical method implementation**
  - Sample and data sharing, troubleshooting, method development
- **Pilot-scale biomass handling, fermentation, & downstream processing**
  - Primary recovery and separations (S/L, L/L, S/L/L, volatiles)
  - Purification
  - Chemical finishing and polishing
  - Packaging and stability
- **Definition of target product profile, QA/QC specs, and TEA**

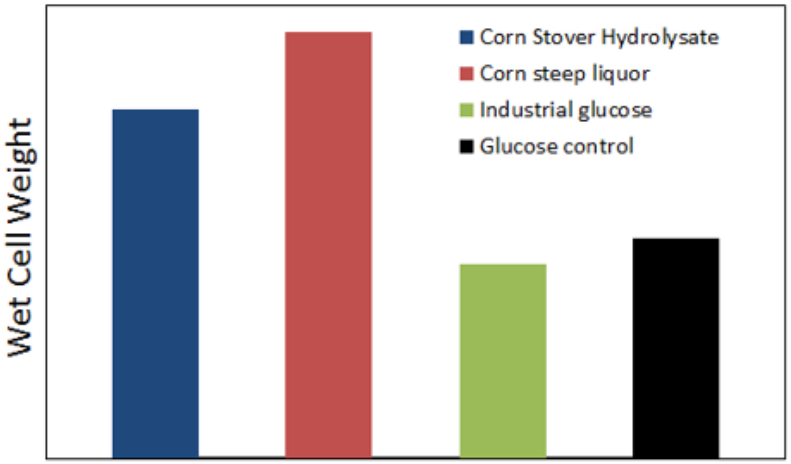
Optimizing food protein production from biomass using statistical Design of Experiments





Fermentation Process Optimization and Scale-Up

BETO Technology-to-Market / Seedling funding



Providing a critical resource with several DOE / EERE / BETO programs and consortia

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cyclotronroad

co-OPTIMA

BETO Small Business Lab Calls and Industrial Seedlings

Small Business Vouchers Pilot
ENERGIZING THE CLEAN ECONOMY

BIOPROCESSING SEPARATIONS CONSORTIUM

http://www.bioesep.org/2018/05/04/direct-funding-opportunity-announcement/

Working with industry partners via other agency programs

Relevant Mission Areas at the Berkeley Lab

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Biological Systems and Engineering:

To lead efforts that combine the power of biology with the tools of engineering to develop sustainable energy and biomanufacturing solutions and improve human health.

ABPDU:

Partner with researchers from industry, the National Labs, and academia to optimize and scale technologies for bio-based chemicals / materials / fuels commercialization.

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