



Rhizopus Enzymes and Expression Systems

What is this technology?

- Enzymes (polygalacturonases), isolated from *Rhizopus oryzae* as processing aids in biomass conversion
- A protein expression system to ultimately overcome issues related to the high cost of enzyme production.

Rhizopus oryzae expressing
Green Fluorescent Protein

What problem does this technology address?

- Polygalacturonase enzymes required to completely convert a number of crop residues/wastes to simple sugars for production of biofuels and value-added products.
- Acts on pectin, a major component of plant cell walls, citrus rinds.
- *Rhizopus* expression system addresses productivity and cost concerns related to current enzyme production systems.
- Major impediment to efficient and cost-effective production of biofuels.

What is the significance of this technology?

- The polygalacturonase enzymes are very stable, relative to what is generally available on the market today.
- In addition to importance to biofuels production, also useful as a bioprocessing aid in juice clarification, production of linens and potentially, the pulp and paper industry.
- Protein expression system provides an opportunity to overcome issues related to productivity and cost in the production of enzymes associated with current technology.
- Potentially useful tool to those in the protein and enzyme production industries to efficiently produce and recover enzymes and proteins of interest.

Moving forward

- Development and characterization of the polygalacturonase enzymes will be completed shortly.
- Additional testing and support in different applications will be required and welcomed.
- *Rhizopus* protein expression system has moved past the proof of concept stage.
- Research is ongoing to efficiently produce and recover enzymes and proteins of interest.

Contact Information

Jeff Mertens, Ph.D, Research Molecular Biologist, Fermentation Biology Research

309 681-6086; jeffrey.mertens@ars.usda.gov

http://ars.usda.gov/main/site_main.htm?modecode=36-20-65-00