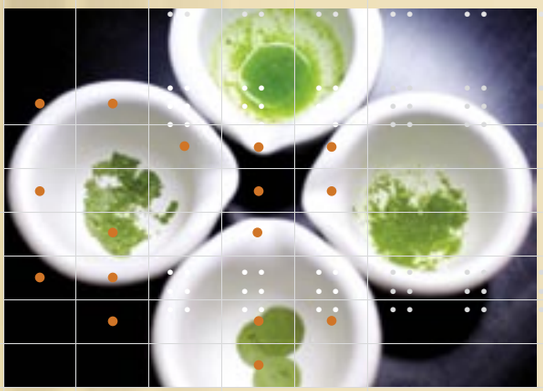
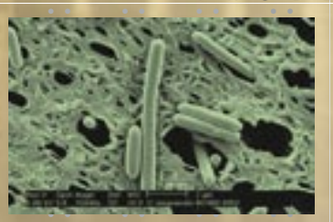


MOLECULAR BIOENGINEERING OF BIOMASS CONVERSION

PROBLEM



How does genomic information allow for improvements in the efficiency of bioconversion of plant cell wall materials and fibers to value-added products? Several limitations need to be overcome before plant/crop based resources and processes become a viable alternative to petrochemical-based systems for chemicals and energy. Genomic information offers an opportunity to address these limitations.

RESEARCH

The Molecular Bioengineering of Biomass Conversion Research Theme will draw together a multi-disciplinary team of researchers with backgrounds in plant genetics and genomics, microbial biochemistry, physiology, microbial ecology, chemical engineering and economic modeling to carry out a horizontal research strategy that addresses the fundamental challenges along the entire biomass chain — from feedstock input to conversion processes, and ultimately, production, recovery and utilization. The research strategy will examine:

- How information obtained from plant genomes and proteomics may allow for alterations in plant cell wall materials, thereby making them more amenable for bioprocessing
- How metabolic engineering in combination with directed evolution and rational design methods may be used to re-engineer microbes in order to generate novel compounds
- How new technologies for bioreactor design and engineering, product recovery, isolation and purification of targeted biomolecules can be optimized
- How economic modeling can be used as a predictor of commercial success for production of new biomolecules from renewable biomass

BENEFITS

By focusing on an integrated, multidisciplinary approach toward replacing the petroleum-based economy with an economy that uses agricultural crops and co-products as a platform, we anticipate production of commercially viable chemicals and biofuels. This will add value to both urban and rural economies, while at the same time reducing the environmental impact associated with petrochemical-based processes.

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