Science Perspectives Article Promotes a Vision for Integrated Bioenergy Future

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 AJ Ragauskas, CK Williams, BH Davison, G Britovsek, J Cairney, CA Eckert, J Frederick, JP Hallett, D Leak, CL Liotta, JR Mielenz, R Murphy, R Templer, T Tschaplinski, "The Path Forward for Biofuels and Biomaterials," Science 311(5760), 484-489. (2006)

• Consensus from joint workshop of Georgia Tech, Imperial College of London and ORNL in

April 2005.

 Advances in genetics, biotechnology, process chemistry, and engineering are leading to a new manufacturing concept for converting renewable biomass to valuable fuels and products, generally referred to as the biorefinery. The integration of agroenergy crops and biorefinery manufacturing technologies offers the potential for the development of sustainable biofuels, biopower and biomaterials that will lead to a new manufacturing paradigm.

Enhanced biomass production/
acre by reducing perception of
nearest neighbor by manipulating
photomorphogenic responses of
phytochrome Red/FR light
perception system

Controlled and readily processable cellulose,
hemicellulose, and lignin. Tailored biomass
composition with value-added chemicals

Increased photosynthesis

Optimized photoperiod response

Pest/disease resistance, Drought/cold tolerance Floral sterility

Regulated dormancy Delayed leaf senescence

Greater carbon allocation to stem diameter vs. height growth

Less extensive root system to maximize aboveground biomass Optimal nitrogen acquisition and use

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