HIGH THROUGHPUT SCREENING OF CELL WALL COMPOSITION FOR BIOFUELS PRODUCTION

Robert Sykes,[1,2] Kristen Gracom, Geoffery Turner, Evandro Novaes, Gary Peter, Jerry Tuskan, Steve Decker, and Mark Davis

[1]National Renewable Energy Laboratory, Golden, CO [2]BioEnergy Science Center, Oak Ridge, TN

Recent developments in elucidation of lignin biosynthetic pathway have led to the development of new ways of modifying lignin structure, composition, and content. In conjunction with the BioEnergy Science Center funded by DOE, we have developed a surrogate method for estimating Klason lignin content from pyrolysis mass spectra peak intensities. Lignin content is determined from the intensities of selected peaks that have been previously assigned to ions arising from lignin fragmentation and calibrated to known standards. In addition to lignin, a high throughput method was also developed to measure and Glucose and Xylose release after pretreatment using an enzyme assay.

We have used pyrolysis Molecular Beam Mass Spectroscopy (pyMBMS) and in conjunction with sugar release data to analyze large populations for changes in lignin, carbohydrates, and recalcitrance of cell wall material. These two techniques can be combined to rapidly test large numbers of individual clones as well as different feedstocks for biofuel production. In addition, the data obtained from these two methods can be used to identify genes associated with lignin and carbohydrate structure using Quantitative Trait Loci studies.