**Cell Wall Composition and Bioenergy Potential of Rice Straw Tissues Are Influenced by Environment, Tissue, Type and Genotype**

Developing modern crops for human use has a rich history. Although there have been significant advances in increasing the harvest index of crops to maximize grain production, much of the crop residues are not utilized, making them an attractive source of biomass for bioenergy production. One major obstacle to using plants for bioenergy production is reducing the recalcitrance of the plant cell wall to deconstruction and conversion to biofuels. And one approach to reducing recalcitrance is to use a targeted breeding program to select traits that make the plant cell wall easier to process. In addition, a major challenge in designing and implementing a breeding program is identifying traits that can be used as predictors of plant performance across different environments. For example, many targeted breeding programs utilize a combination of greenhouses in the winter and fields in the summer to maximize the number of breeding cycles performed per year. Therefore, it’s critical that traits used for selection of plants grown in greenhouses are relevant to plants grown in the field (and vice versa).

Researchers from GLBRC and JBEI participated in a study that examined 16 compositional traits of stem and leaves from 20 diverse rice varieties grown in greenhouses and fields in an effort to identify compositional trends that can be used in breeding bioenergy dedicated crops across environments. Among other things, this work showed that environment plays a large role in cell wall composition and bioenergy traits, but that the amount of glucose released after a hot water pretreatment correlated well between environments. The authors propose that developing varieties that respond well to hot water pretreatment would be a viable option because it’s a relatively inexpensive pretreatment process.

**References:** Tanger P, Vega-Sanchez ME, Fleming M, Tran K, Singh S, Abrahamson JB, Jahn CE, Santoro N, Naredo EB, Baraoidan M, Danks JMC, Salt DE, McNally KL, Simmons BA, Ronald PC, Leung H, McKay JK, Leach JE. Cell Wall Composition and Bioenergy Potential of Rice Straw Tissues Are Influenced by Environment, Tissue Type, and Genotype. Bioenergy Research. 2015 Jan 11. DOI 10.1007/s12155-014-9573-y

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