

## Field testing of a low lignin engineering strategy in switchgrass

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**Project Goals: A multi-species data set will be generated to understand the changes in the molecular mechanism observed in plants as a result of the low lignin engineering strategy using transcriptomics and untargeted metabolomics.**

Switchgrass (*Panicum virgatum* L.) is a promising perennial dedicated bioenergy feedstock. It can grow on marginal lands and produce abundant biomass. Modification of lignin composition for improved deconstruction is an important strategy for biomass improvement. Previously, the JBEI Feedstocks team developed a dominant strategy to reduce lignin content, while increasing the proportion of H-lignin, which relied on the expression of a bacterial enzyme - 3-dehydroshikimate dehydratase (*QsuB*) in *Arabidopsis*<sup>1</sup>. This strategy was first successfully tested in switchgrass in the greenhouse and is now being tested in a small-scale multi-year field trial. Previously, we had demonstrated that this strategy resulted in increased saccharification efficiency and low lignin content, with no change to growth in *Arabidopsis* or greenhouse-grown switchgrass. Field data collected from three-cuttings showed an increase in plant height and biomass from the *QsuB* lines as compared to untransformed controls (Alamo). We are now using RNAseq and metabolomics to explore the reasons for these changes in collaboration with JGI. We are also testing the *QsuB* strategy in other key bioenergy feedstocks, including sorghum and poplar. Future work will include expanding the field trial to include multiple field sites, as well as a water-deficit trials.

### References

1. Eudes A, et al. (2015) Plant Biotech. J. 13:1241.

*The work conducted by the Joint BioEnergy Institute was supported by the Office of Science, Office of Biological and Environmental Research, of the U.S. Department of Energy under Contract No. DE-AC02-05CH11231.*

*The work conducted by the U.S. Department of Energy Joint Genome Institute, a DOE Office of Science User Facility, is supported by the Office of Science of the U.S. Department of Energy under Contract No. DE-AC02-05CH11231.*