Biochemical and Molecular Analysis of a Sorghum Bioenergy Panel for Lignin Content Variation

Damasceno, C.M.B., Parrella, R.A.C., Simeone, M.L.P., Schaffert, R.E., Magalhães, J.V.
Embrapa Milho e Sorgo, Sete Lagoas, Brazil.

Large scale production of lignocellulosic biofuels is yet to become a reality due to technological problems, which include the interfering effect of cell wall lignin in the biomass conversion process. Therefore, selecting dedicated crops containing cell wall compositional traits favorable to superior biomass conversion is expected to make biofuel production economically feasible. Sorghum has the potential to be one of these dedicated crops because of its high biomass yield, low water and fertilizer requirements and tolerance to mineral, drought and heat stress. In this work we applied molecular and biochemical analysis to identify sorghum genotypes demonstrating lower lignin content. A genetically diverse sorghum panel was screened for lignin content and other cell wall components, using standard biochemical methods. Lignin content varied from 2 to 11% of total dry matter, and averaged 5.8%. In order to better understand lignin synthesis in sorghum, we have identified sorghum homologs of key genes involved in the lignin biosynthesis pathway, and used Real-Time PCR to study their expression. Five of these genes appear to be co-regulated as indicated by highly correlated expression levels across genotypes. In addition, the genes *C3H* and *HCT* showed high and positive correlation coefficients. Genes showing differential expression among accessions that have contrasting lignin content will be validated by association analysis.

Keywords: biofuel, lignin, sorghum

Acknowledgements: Embrapa, Sweetfuel Project, FAPEMIG.