Insights of biomass recalcitrance in *Populus trichocarpa* natural variants for biomass conversion


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Figure S1. Correlation between glucose release and xylose release of *P. trichocarpa* natural variants ($R^2=0.50$, Pearson coefficient=0.705, *p*-value=0.023)
Figure S2. Correlation between sugar release and cellulose crystallinity of *P. trichocarpa* (CrI vs glucose release: $R^2=0.06$, Pearson coefficient=0.078, $p$-value=0.831; CrI vs xylose release: $R^2=0.003$, Pearson coefficient=-0.001, $p$-value=0.998)
Figure S3. Correlation between lignin S/G ratio and \(\beta-O-4\) linkage content \((R^2=0.17,\) Pearson coefficient=0.411, \(p\)-value=0.238)

Figure S4. Correlation between lignin S/G ratio and \(\beta-5/\beta-\beta\) linkage content \((S/G\) ratio vs \(\beta-5\): \(R^2=0.40,\) Pearson coefficient=0.634, \(p\)-value=0.049; \(S/G\) ratio vs \(\beta-\beta\): \(R^2=0.11,\) Pearson coefficient=0.328, \(p\)-value=0.355)
Figure S5. Correlation between β-O-4 linkage content and sugar release (β-O-4 vs glucose release: $R^2=0.25$, Pearson coefficient=0.498, $p$-value=0.143; β-O-4 vs xylose release: $R^2=0.27$, Pearson coefficient=0.517, $p$-value=0.126)
Figure S6. Correlation between β-β linkage content and sugar release
(β-β vs glucose release: $R^2=0.002$, Pearson coefficient=$-0.045$, $p$-value=0.901; β-β vs xylose release: $R^2=0.0003$, Pearson coefficient=$-0.017$, $p$-value=0.963)
Figure S7. Correlation between maximum amount of orange dye adsorption and sugar release (Orange dye vs glucose release: $R^2=0.41$, Pearson coefficient=0.641, $p$-value=0.046; Orange dye vs xylose release: $R^2=0.24$, Pearson coefficient=0.493, $p$-value=0.148)

Figure S8. Correlation between maximum amount of blue dye adsorption and sugar release (Blue dye vs glucose release: $R^2=0.56$, Pearson coefficient=0.747, $p$-value=0.013; Blue dye dye vs xylose release: $R^2=0.16$, Pearson coefficient=0.397, $p$-value=0.256)
**Figure S9.** Correlation between cellulose accessibility and lignin S/G ratio

**Figure S10.** Correlation between cellulose accessibility and cellulose DP w
Figure S11. Correlation between cellulose accessibility and cellulose crystallinity index
Figure S12. Differentially expressed genes between *P. trichocarpa* natural variant genotypes
Table S1. The list of correlation efficient between physicochemical property analysis and differentially expressed genes over natural variant.