

## **CELL 256: Role of dispersion and polar interactions in the adsorption of cellulases onto lignin**

**Abstract:** Residual lignin in pretreated biomass hinders its enzymatic hydrolysis. Nonionic surfactants are known to have beneficial effects on the enzymatic hydrolysis of lignocellulosic biomass but their mechanisms of action at the molecular level are incompletely understood. This study investigates the effect of a nonionic surfactant, Tween 80, on the adsorption of cellulases onto model lignin substrates. Lignin substrates were prepared by spin coating of flat substrates with three different types of lignin: organosolv lignin, kraft lignin, and milled wood lignin. Tween 80 and cellulase adsorption onto the lignin substrates was analyzed with a quartz crystal microbalance with dissipation monitoring. Supporting experiments of Tween 80 and cellulase adsorption onto self-assembled monolayers with lignin-related functional groups provided critical insights into the role of polar and dispersive functional groups in lignin on cellulase adsorption and the effect of Tween 80 on the process.

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