

Confocal fluorescence microscopy/modeling of lignolytic mechanisms

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Reactive oxygen species (ROS) are powerful one-electron biodegradative oxidants produced by fungi during wood degradation. We present results showing that for the soft rot fungus ascomycete *Daldinia concentrica*, oxidation is contained within the wood and is not observed in the aqueous medium around it. That is, the biodegradative oxidants produced by this fungus are not diffusible. This contrasts sharply with our results for the basidiomycetes *Gloeophyllum trabeum* (brown rot) and *Ceriporiopsis subvermispora* (white rot), which clearly produce diffusible, water-soluble oxidants.

We also discuss the development and potential use of novel fluorescent probes, based on the loss of FRET (fluorescent resonance energy transfer) between linked dyes, which occurs via oxidative cleavage of a polyethylene glycol (PEG) linker. This reaction appears to be specific to highly oxidative, hydrogen-abstracting ROS. These new probes will likely prove useful, in that they should only respond to high energy oxidants that are able to cleave lignin.