

# Hydroquinone and H<sub>2</sub>O<sub>2</sub> differentially affect the ultrastructure and expression of ligninolytic genes in the basidiomycete *Ceriporiopsis subvermispora*

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## Abstract

The biodegradation of lignin is a highly oxidative process in which various oxidases and peroxidases play a major role. During lignin decay, the generation of aromatic compounds and reactive oxygen species leads to oxidative stress. In this work, the effect of the oxidative compounds H<sub>2</sub>O<sub>2</sub> and hydroquinone in the ligninolytic fungus *Ceriporiopsis subvermispora* was studied, both at the ultrastructural and at the transcriptional level. Transmission electron microscopy revealed the presence of microvesicles and extensive cytoplasm degeneration after incubation with hydroquinone, but not with H<sub>2</sub>O<sub>2</sub>. Studies of the intracellular redox state of the fungus showed that hydroquinone causes a transient decrease in the reduced glutathione/oxidized glutathione (GSH/GSSG) ratio and an increase in the glutathione-S-transferase mRNA levels. These results suggest that hydroquinone produces oxidative stress in this microorganism. On the other hand, it was observed that hydroquinone, but not H<sub>2</sub>O<sub>2</sub>, affects Mn-dependent peroxide and laccase transcripts levels. We propose that the mechanism by which the fungus reacts against oxidative stress contributes to its selectivity toward lignin during wood decay.