

Abstract

This work is aimed at the study of the effect of 17 α -ethinylestradiol (EE2) on the production and characteristics of ligninolytic enzymes (laccase, Mn-dependent peroxidase and lignin peroxidase) in *I. lacteus*, *T. versicolor*, *P. chrysosporium* and *P. ostreatus* cultures grown on two types of liquid media.

Enzyme activity production in fungal cultures was affected by the composition of culture medium. In the case of *P. chrysosporium*, the addition of EE2 to the complex-medium cultures led to a MnP activity stimulation and simultaneously LiP production was partially repressed in these cultures. In the mineral MM medium, no effect of EE2 on enzyme production by *P. chrysosporium* was observed. In EE2 treated MM cultures of *P. ostreatus* lower MnP activities were found when compared to biotic controls. In the case of *T. versicolor* cultures, the addition of EE2 to the complex medium caused laccase and LiP stimulation in the cultures. In the MM medium, however, only laccase production was affected by EE2. *I. lacteus* MnP production was partially repressed by EE2 in MM medium. In contrast to that, significantly higher MnP activities were detected in complex-medium *I. lacteus* cultures after the treatment with EE2.

Further EE2 degradation by the fungal cultures was studied. The highest degradation efficiency was observed in *I. lacteus* and *T. versicolor* cultures that were able to remove 10 mg/l of EE2 within 3 days of incubation. Degradation experiments *in vitro* showed that laccase (*T.versicolor*) and MnP (*I. lacteus*) activity present in culture supernatant and fungal mycelium played the key roles in EE2 degradation by the fungi.

Compared to biotic controls, a higher amount of MnP transcripts was detected in *I. lacteus* cultures degrading EE2 7 to 12 days after the addition of EE2. The addition of EE2 to *T. versicolor* cultures led to an increase in the transcription level of a specific laccase encoding gene on day 2 of the cultivation. In addition to that, pI profiles of *I. lacteus* MnP and *T. versicolor* laccase underwent changes during the culture cultivation. The results of this work suggest that more than one regulation mechanism takes place in ligninolytic enzyme production by white rot fungi. (*The work is written in Czech*)

Key words: 17 α -ethinylestradiol, ligninolytic fungi, laccase, Mn-dependent peroxidase, gene expression, quantitative real-time PCR