Physiological Regulation of Basidiomycetes Lignocellulolytic Enzyme Activity

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The biosynthesis of cellulases and xylanases in all white rot basidiomycetes is inducible by addition of cellulose as a carbon source. The characteristic feature of brown rot fungi is constitutive synthesis of enzymes even in the presence of glucose as a carbon source. However, cellulase and xylanase of *Piptoporus betulinus* (Bull.: Fr.) Fr. are inducible enzymes in the presence of cellobiose as a sole carbon source. Catabolite repression of cellulase and xylanase synthesis in the presence of easily metabolizable carbon source is widespread in all fungi with inducible enzyme synthesis. It was shown that R-glucosidases and R-xylosidases of five basidiomycetes strains appear to be constitutive enzymes; however, the level of their activities is dependent on the carbon source in the medium. In the fungi studied R-glucosidases are secretory enzymes, while R-xylosidases are most likely intracellular enzymes.

The role of an easily metabolizable carbon source in regulation of ligninolytic enzyme production was established. The use of cellobiose instead of avicel as a carbon source results in a 20-fold increase in *Cerrena unicolor* (Bull.) Murr. IBB 62 laccase activity. Mannitol was the best carbon source for *Pleurotus ostreatus* (Jacq.: Fr.) Kumm. and *Phlebia radiata* Fr., whereas glucose ensured the highest laccase activity of *Funalia trogii* (Berk.) Bond. et Sing. Addition of 2,5-xylidine enhanced laccase production 3–5-fold by *Cerrena unicolor, Coriolus pubes*cens (Schumach.) Quél, *Panus tigrinus* (Bull.) Sing., and *Pleurotus ostreatus*. Only veratryl alcohol increased Mn-dependent peroxidase activity of *Cerenna unicolor* IBB 62 (7-fold), whereas vanillic aldehyde and vanillic alcohol prevented secretion of this enzyme.

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