IMPROVEMENT IN DYE DECOLORATION BY THE SYSTEM LACCASE-MEDIATOR FROM *Trametes hirsuta*.

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Introduction. Laccase is a phenol oxidase (E.C.1.10.3.2) that catalize the four electron reduction of oxygen to water. These enzymes are capable to transform a wide variety of aromatic compounds. The laccase unspecificity make these enzymes highly interesting in environmental applications such as textile wastewaters treatment (1). The low redox potential of laccase allow only the degradation of phenolic compounds and not the degradation of aromatic including dyes. However, the broad of substrate specificity of laccases may be expanded by addition of redox-mediators (2).
The aim of this study was to evaluate the potential of naturally phenolic compounds to mediate the oxidative reactions catalized by laccases from *T. hirsute.* Also the contribution of laccase isoforms in dye decolorization was investigated.

Methods. Laccase L1, L2 and L3 produced by *T. hirsuta* on wheat bran culture were previously purified (3). Screening of natural mediators was based on the decolorization of indigo carmine (50 mg/L) in presence of 100U of *T hirsute* laccase (crude extract and isoenzymes), two concentrations of potential mediators (0.2-0.5 mM), pH 4.5 and 40ºC. The effect of individual and combined laccase isozymes on dye decolorization was also evaluated. Decrease in the absorbance maxima of dye at different incubation time was measured at 420 nm. Absortion spectra between 275-800 nm were recorded during textil effluent decolorization with selected mediator.

Results. Syringaldehyde, *p*-coumaric acid and vainillic acid promoted the total of decolorization of indigo carmine with crude laccases (10 h), although with syringaldehyde was in a short time (10 min). Also, 100% of color was removed by L1, L2 and L3 with this mediator. Vainillic acid and *p*-coumaric were good redox-mediators of L1 and L2 respectivelly. The efficiency of laccase mediator system depends on the mediator, oxide-reduction potential of enzyme and structure of dye (4). The ability of laccase crude and isozymes with syringaldehyde on effluent decolorization was also evaluated. Results showed that L1, L2 and L3 are involved en the decolorization process, however L1 and L2 were more efficient. The decoloration of indigo and textile effluent was increased by the combined action of isozymes. The percent of decoloration of textile effluent was in a range of 65-70% at 10 h.

Conclusions. Natural lignine phenols such as syringaldehyde, *p*-cumaric and vainillin acid represent alternatives of, cheaper and ecofrendly mediators to decolorize textile dyes by laccases from *T. hirsuta*. The combined action of laccase isozymes showed additive effect in effluent treatment and represent a potential in future biotechnological applications

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