Textile Dyes Decolorization and Ligninolytic Activity by Marine-Derived *Peniophora* sp. CBMAI 1063

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Abstract:

Decolorizing ability of textile dyes by ligninolytic fungi has been extensively studied in terrestrial basidiomycetes. However, the recent isolation of strains with a better color removal ability than reference strains directs worldwide attention towards the searching of fungi belonging to different ecophysiological and taxonomic groups. Therefore, the marine-derived basidiomycete *Peniophora* sp. CBMAI 1063 was evaluated on its ability to decolorize two important dyes in the Brazilian textile industry: RBBR and Indigo. To evaluate the decolorization on solid media, *Peniophora* sp. CBMAI 1063 was inoculated in three different media (MA2: 2% malt extract agar, MA2+3%NaCl and MA2ASW: formulated with artificial seawater) added by 200 mg/L of RBBR and Indigo dyes. Additionally, the fungus was inoculated with Indigo dye in solid media: MA1 (1% MA agar), MA1+3%NaCl, MA1ASW and MA0.5, MA0.5+3%NaCl, MA0.5ASW. After initial screening on solid media containing RBBR, the fungus was inoculated on liquid medium supplemented with RBBR (500 and 1000 mg/L) for 7 days at 28°C. RBBR decolorization was also evaluated in enzymatic extract (RBBR-free) that presented ligninolytic activity. Results from decolorization ability on solid media for both dyes, with and without salt, showed that fungal mycelia were, in general, not affected by dyes, since the mycelial growth were kind similar to the controls (dyes-free). However, no decolorization was observed for Indigo dye after 7 days. On the other hand, significant RBBR decolorization was achieved after 7 days in MA2 medium (without salt). Therefore, the fungus was submitted to the experiments on liquid medium and showed, in this condition, a complete decolorization (>100%) after 4 days of incubation. It is important to mention that the highest ligninolytic enzymes (MnP and lacase) activities were detected in 3th and 4th days, respectivelly. Results from enzymatic decolorization (culture supernatants) showed a decrease of 93% in the absorption spectrum after 2h, reaching 100% after 24h. This result support the hypothesis that RBBR decolorization can be accomplished in the absence of mycelium. Data derived from the present work stimulate new studies concerning decolorization and degradation of textile dyes and colored effluents from the textile industries. Financial support: Fapesp and CNPq

Key words: Dye decolorization, marine fungus, ligninolytic enzymes