# CHARACTERIZATION OF THE GROWTH AND LACCASE ACTIVITY OF STRAINS OF *PLEUROTUS OSTREATUS* IN SUBMERGED FERMENTATION

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Kinetic parameters of growth and laccase activity of five ATCC strains of *Pleurotus ostreatus* in submerged fermentation were evaluated. The best strain for laccase production and the time of maximum laccase activity were also determined. The greatest laccase activity (37490 U/L), laccase productivity (78 U/L h), specific growth rate (0.026/h), and specific rate of laccase production (119 U/gX h) were observed with the strain of *P. ostreatus* ATCC 32783. In general, the isoenzyme patterns were different in all the cases; however, all the strains showed two laccase bands in the same position in the gel. Not all strains responded in the same way to the addition of Cu in the culture medium. In general, the sensitivity to Cu could be used to select strains having high laccase activity for commercial exploitation.

*Keywords: Laccase; Fermentation; Pleurotus ostreatus; Zymogram*

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## INTRODUCTION

Laccases (p-diphenol:dioxygen oxidoreductases; EC 1.10.3.2) are glycoproteins that belong to the group of blue multi-copper oxidases, which use oxygen as an electron acceptor to remove hydrogen radicals from phenolic hydroxyl groups (Gianfreda et al. 1999; Thurston 1994). They catalyze the removal of a hydrogen atom from the hydroxyl group of methoxy-substituted monophenols, *ortho*- and *para*-diphenols, and also can oxidize other substrates such as aromatic amines, syringaldazine, and non-phenolic compounds, to form free radicals (Bourbonnais et al. 1997; Li et al. 1999; Robles et al. 2000). After long reaction times, there can be coupling reactions between the reaction products and even polymerization. It is known that laccases can catalyze the polymerization of various phenols and halogen, alkyl-, and alkoxy-substituted anilines (Kobayashi et al. 2001, 2003).

Due the catalytic action of laccases, these enzymes can be used for various biotechnological and environmental applications such as textile dye decolouration, delignification, pulp bleaching, effluent detoxification, biosensing, and bioremediation (Thurston 1994; Hublik and Schinner 2000; Mayer and Staples 2002). Laccases have been found mainly in white rot fungi, in other fungi, insects, some plants, and bacteria (Guillen et al. 2000; Galhaup et al. 2002). However, the successful use of laccases in bioremediation processes is based both on obtaining an organism that produces enzymes with the best catalytic properties, and on establishment of the conditions for development