Effect of Picloram on the Production of Laccase and Biomass by Different White Rot Fungi under Ligninolytic and Non-Ligninolytic Conditions

Maciel, G. M.; de Souza, C.G.M.; Inácio, F.D.; Peralta, R. M.
Departamento de Bioquímica, Laboratório de Bioquímica de Microrganismos, Universidade Estadual de Maringá, PR, Brazil

Picloram (PIC) is a chlorinated herbicide, quite persistent in the environment and highly mobile in soil and water. White-rot fungi (WRF) are essentially basidiomycetes capable of producing extracellular non-specific lignin-modifying enzymes, such as laccases, that catalyze the degradation of lignin and a wide variety of organic pollutants. The aim of this study was to evaluate the ability of different strains of WRF to: (1) tolerate PIC, (2) produce laccase in presence and absence of PIC and (3) remove PIC from the culture medium. The experiments were carried out for 7 days in static liquid cultures under ligninolytic (LY) and non-ligninolytic (NLY) conditions. PIC was added in the concentration of 0.1 mM. Most of the strains were quite tolerant to the herbicide. The biomass production of some strains was slightly stimulated by PIC. The addition of rice straw (LY condition) to the culture medium provided higher results of biomass and laccase for almost all WRF. The highest values of biomass were 24 g/L and 22 g/L for *Ganoderma lucidum* and *Trametes* sp. in LY condition with PIC. Some WRF presented higher laccase activities in the presence of PIC. These fungi could be producing this enzyme in response to a stressful condition. Highest laccase activities of 368 U/g and 313 U/g were achieved in LY cultures by different strains of *Pycnoporus* sp. in the presence and absence of PIC, respectively. The slight reduction of picloram concentration in the culture filtrates of all WRF was not attributed to biodegradation, but biosorption.

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