Proceedings of the 8th International Conference on Environmental Science and Technology
Lemnos Island, Greece, 8 – 10 September 2003
Full paper Vol. A, pp. 739 - 746

DETOXIFICATION CHARACTERISTICS OF SELECTED *POLYPORUS* SPECIES FOR BIOREMEDIATION APPLICATIONS

F. RIGAS[1], V. DRITSA[1], J. CHATZIDAKIS[1] and R. MARCHANT[2]

[1] National Technical University of Athens, School of Chemical Engineering
[2] University of Ulster, N. Ireland, School of Biological and Environmental Sciences
E-mail: rigasf@central.ntua.gr

EXTENDED ABSTRACT

White rot fungi have been shown to be potent degraders of a variety of environmental organic pollutants. The ligninolytic ability of these fungi depends on the production and secretion of certain radical-generating enzymes, such as lignin peroxidase, manganese peroxidase, and laccase. They differ in their capacity to degrade these compounds, depending on the quality and quantity of the enzymes that are responsible for the biodegradation.

The wood-degrading basidiomycetes *Polyporus brumalis* and *Polyporus ciliatus* used in this work were collected from Ymittos mountain (Athens), isolated and cultivated in the laboratory and identified from the collected fruit bodies. These strains were screened for their ability to decolourise the dye Poly R-478 which was used as a model compound to test their ligninolytic ability. The growth rate and efficiency of decolourisation on agar plates were tested to evaluate the degradation. Plates showed different decolourisation patterns, namely radial decolourisation zones, diffuse areas or no decolourisation. Best strains are those possessing high growth and decolourisation rates.

The decolourisation lag time was of the order of four days after growth. The plates were completely decolourised when the mycelium reached the edge of the plates. The removal of dye was also tested in liquid medium. The fungal cultures showed biosorption and degradation as removal mechanisms. The enzyme activities were tested in liquid cultures and the three isolates expressed laccase and manganese peroxidase, yet no lignin peroxidase. The strains were also screened for their growth tolerance against different concentrations of pentachlorophenol on agar plates.

The project aims at the development of an in situ bioremediation system for contaminated land sites by the action of wood rotting fungi such as the isolated *Polyporus* strains.

Key words: Bioremediation, wood-degrading fungi, detoxification, degradation, biosorption, *Polyporus sp*., toxic organic pollutants.