

[P2.40]

Effect of alkaline conditions on decolourisation of reactive black 5 by white rot fungi

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Dyes have been extensively used in a broad range of industries, especially in textiles. Dyeing textiles generate large amounts of alkaline effluents with high concentration of salts. White rot fungi are very efficient ligninolytic microorganisms capable of degrading various types of dyes due their extracellular oxidative enzymes, mainly lignin peroxidase (LiP), manganese peroxidase (MnP) and laccase (Lac). This study aims to find the best conditions to WRF decolourise the reactive black 5 (RB5) in extreme conditions of alkalinity.

Three different *Trametes versicolor* (MUM94.04, 04.100 and 04.101) plus *Phanerochaete chrysosporium* (MUM94.15) obtained from the Micoteca da Universidade do Minho (MUM) culture collection were used. Screening RB5 decolourisation was carried out on plates containing yeast nitrogen base, saccharose and RB5 with a pH range from 8.0 to 10.0. The radial fungal growth and decolourised zones formed after incubation at 30 °C over 28 days were recorded. Afterwards, these fungi were also studied on liquid medium and the LiP, MnP, Lac as well glyoxal oxidase and protease activities were determined. Biomass and saccharose concentrations were also determined. *T. versicolor* MUM94.04 and 04.100 gave similar results to the high alkalinity conditions. These two strains are promising tools to textile wastewater treatment.

Keywords: White rot fungi (WRF), Reactive black 5 (RB5), Alkaline conditions, Decolourisation