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Reactive Black 5 dye decolourisation by free and immobilized cells of *Trametes versicolor* in chemostat under high alkaline and salt conditions

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The most important group of synthetic colourants, that it is used extensively in the textile industries, is azo dyes. During the dyeing process, a large amounts of alkaline effluents with high concentration of dyes and salts are released without previous treatment for aquatic environment. Nowadays, environmental regulations in most countries require textile effluents to be decolourised before discharging. This led to the study of innovative and environmental friendly technologies. The use of free or immobilized cells of white-rot fungi (WRF) and/or their extracellular enzymes are currently a promising solution as a treatment or as part of a multi-steps treatment of textile wastewater. The purpose of the present work was to compare the dye decolourisation of recalcitrant di-azo Reactive Black 5 (RB5) using the free and immobilized cells of WRF *Trametes versicolor* in chemostat under controlled conditions. *T. versicolor* MUM 04.100 from Micoteca da Universidade do Minho Culture Collection was used. WRF was immobilized in two different inert supports: polyurethane foam (PUF) and scotch brite (SB). The decolourisation and the enzymatic activities of lignin peroxidise (LiP), manganese peroxidise (MnP), laccase (Lcc) and glyoxal oxidase (GLOX) were assessed during 28 days by continuous and constantly increased addition of a RB5 solution (100 mg l^{-1} at pH 9.5 and 15 g l^{-1} of NaCl) to the chemostat. The decolourisation by WRF achieved a range of 90-100% using free and immobilized cells. When the WRF was immobilized using inert supports (PUF and SB) the maximum values of Lcc activity were similar (up to 5.5 U) which represents 1.25 times higher when compared with free cells. Lcc was the most efficient ligninolytic enzyme involved on dye decolourisation. Mechanisms of metabolic regulation of azo dyes degradation for this strain are now under study.